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editor's note

Sawdust

A hundred years ago or more, it was pretty common for carpenters and joiners to store their tools in a wood tool chest. Some of these have survived down through the years — a testament to the skill and craftsmanship that went into building them. Of course, finding one of these old chests can be a challenge. They have become prized by collectors and can be quite expensive.

But it's not the value that interests me, it's the fact that each chest is a reflection of the craftsman who built it. Some are plain with very straightforward joinery — just built to get the job done. While others are surprisingly ornate and carefully constructed with intricate details and organized trays and drawers.

It was with these thoughts in mind that we designed the tool chest featured in this issue. We wanted to come up with a tool chest design that was simple to build and practical, yet still showed off the abilities of a skilled woodworker. So we combined honest, traditional joinery with authentic-looking hardware for a tool chest that is worthy of any woodworker's shop.

Now, I realize not everyone needs a chest to store their tools these days and that's okay. This project works equally well as a blanket chest or even a coffee table. We've even included an article on how to distress the chest and turn it into an "instant" antique.

So no matter how you decide to build, use, or finish this project, it's sure to become a treasured heirloom.

Terry

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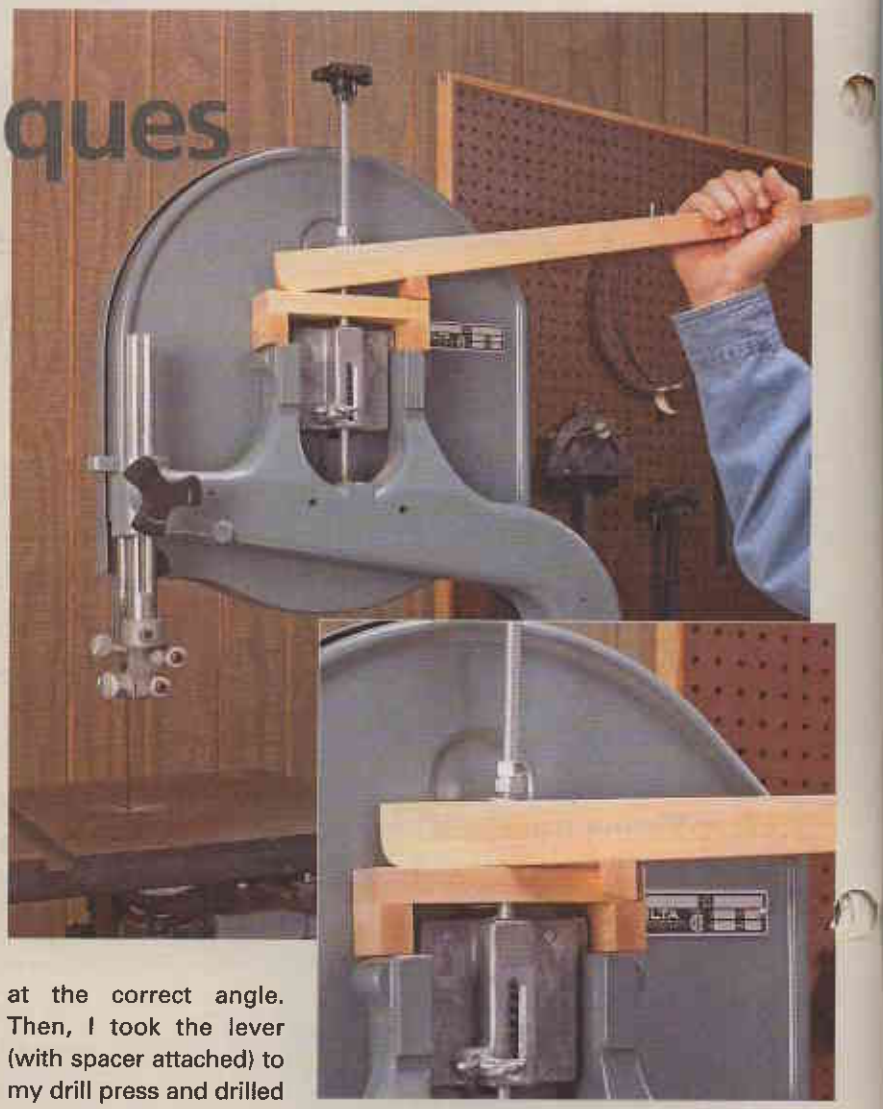
Tips & Techniques



Band Saw Blade Tension Lever

Setting the tension on my band saw blade was time-consuming. I needed a way to release the tension and then quickly return the tension to the proper setting the next time I used the saw. One day, it struck me that I could make a simple lever to quickly release the tension (see photo at right).

First, I replaced the band saw's original "knuckle-busting" tension rod with one long enough to clear the saw's housing. That will make fine-tuning the tension easier.

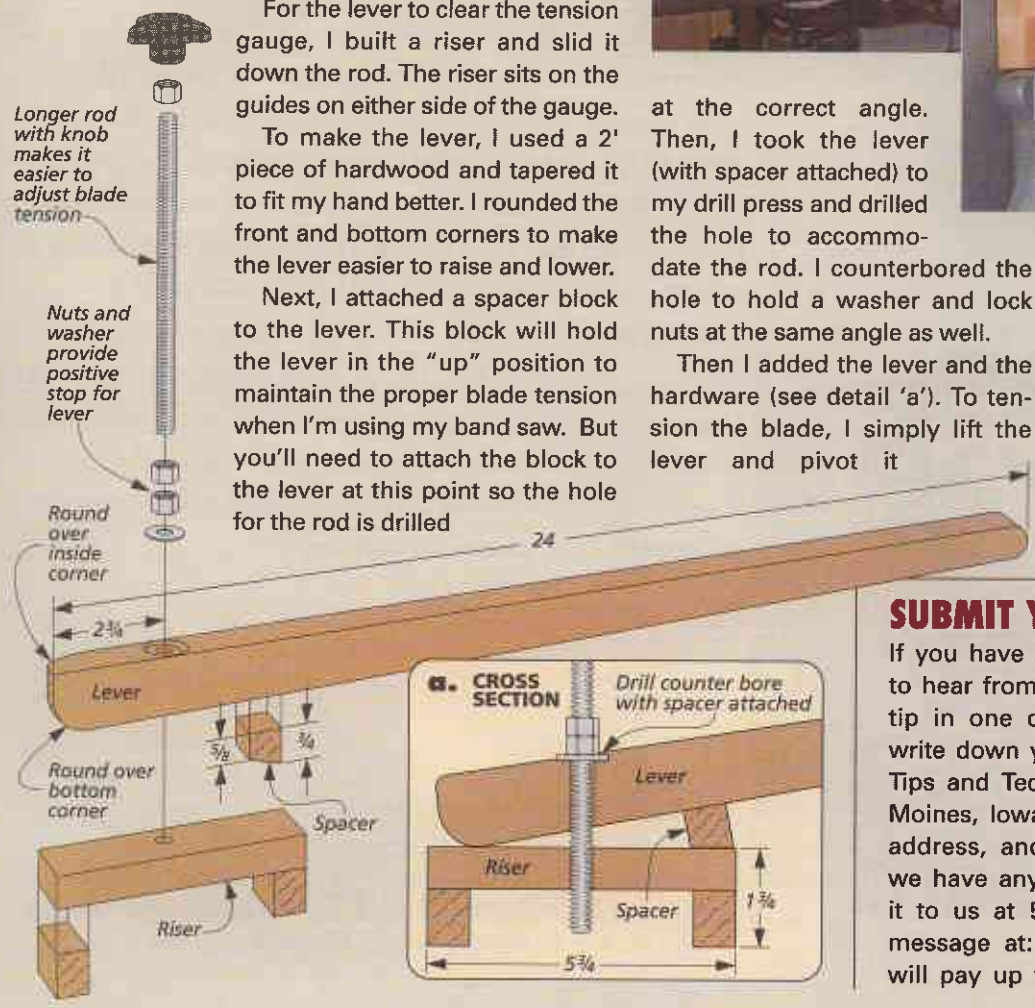
For the lever to clear the tension gauge, I built a riser and slid it down the rod. The riser sits on the guides on either side of the gauge.

To make the lever, I used a 2' piece of hardwood and tapered it to fit my hand better. I rounded the front and bottom corners to make the lever easier to raise and lower.

Next, I attached a spacer block to the lever. This block will hold the lever in the "up" position to maintain the proper blade tension when I'm using my band saw. But you'll need to attach the block to the lever at this point so the hole for the rod is drilled at the correct angle. Then, I took the lever (with spacer attached) to my drill press and drilled the hole to accommodate the rod. I counterbored the hole to hold a washer and lock nuts at the same angle as well.

Then I added the lever and the hardware (see detail 'a'). To tension the blade, I simply lift the lever and pivot it toward the saw until the spacer rests on the riser. To release the tension, all I have to do is just lift and pivot the lever away from the saw. You can still fine-tune the tension if you need to by adjusting the longer tension rod and knob.

Bill Esposito
Rindge, New Hampshire



SUBMIT YOUR TIPS

If you have an original shop tip, we would like to hear from you and consider publishing your tip in one or more of our publications. Just write down your tip and mail it to: *Woodsmith*, Tips and Techniques, 2200 Grand Avenue, Des Moines, Iowa 50312. Please include your name, address, and daytime phone number in case we have any questions. If you would like, FAX it to us at 515-282-6741 or send us an email message at: woodsmith@woodsmith.com. We will pay up to $200 if we publish your tip.

Rolling Cabinet Support

The problem with rolling cabinets is their stability when I need to use them in my shop. Locking casters don't work well for me, because they were always difficult to lock and unlock without a lot of effort and toe-stubbing.

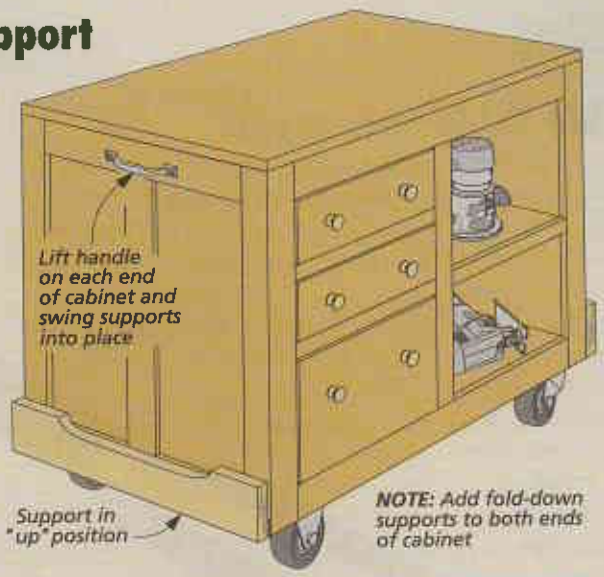
What I decided on was simple and effective fold-down supports (see drawing at right). A slight lift while you swing the supports down on each end, and you have a secure base for your cabinet.

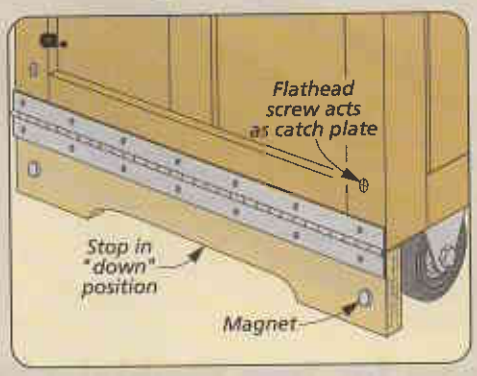
Since the hinges open in opposite directions, they counteract each other and prevent the cabinet from falling off the supports. When I'm ready to put the cabinet away, another slight lift, flip up the supports, and it's ready to move.

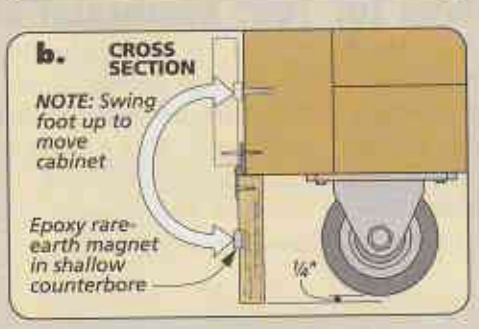
The supports are sized to lift the casters just off the floor. I measured the distance between the bottom of the cabinet and the floor and made the supports ¼" wider. After cutting each support, I created a cutout deep enough to get my shoe underneath (detail 'a').

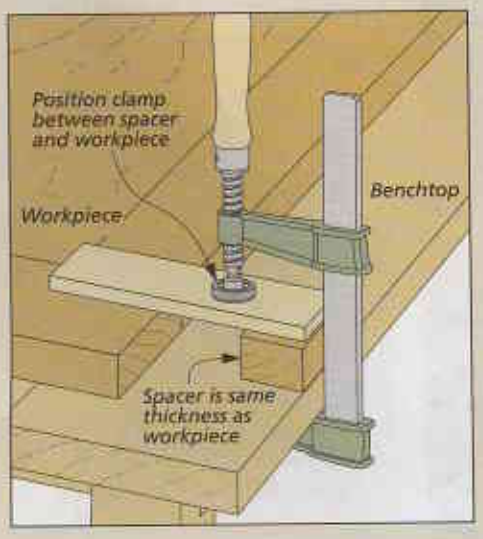
Then I attached the supports to the lower sides of the cabinet with piano hinges, and added handles near the top. The handles help me lift it when I'm ready to put my "foot" down. Rare-earth magnets hold the supports up when I'm rolling the cabinet around (detail 'b').

Norm Roach
North Battleford, Saskatchewan, Canada









Clamp Jaw Extensions

I've run across a few situations when I need clamps to hold a workpiece or template, but the clamps heads would be too short to reach where I needed them, or they would interfere with my tools.

I decided to try the equivalent of machine tool hold-downs. I laid one end of a narrow strip of wood onto the workpiece and the other end on a spacer that's the same thickness as the workpiece. Then I applied the clamps in the middle of the wood strip. These work great, and I can use as many as I need.

Robert Catterson
Pewaukee, Wisconsin

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Interchangeable Table Saw Insert

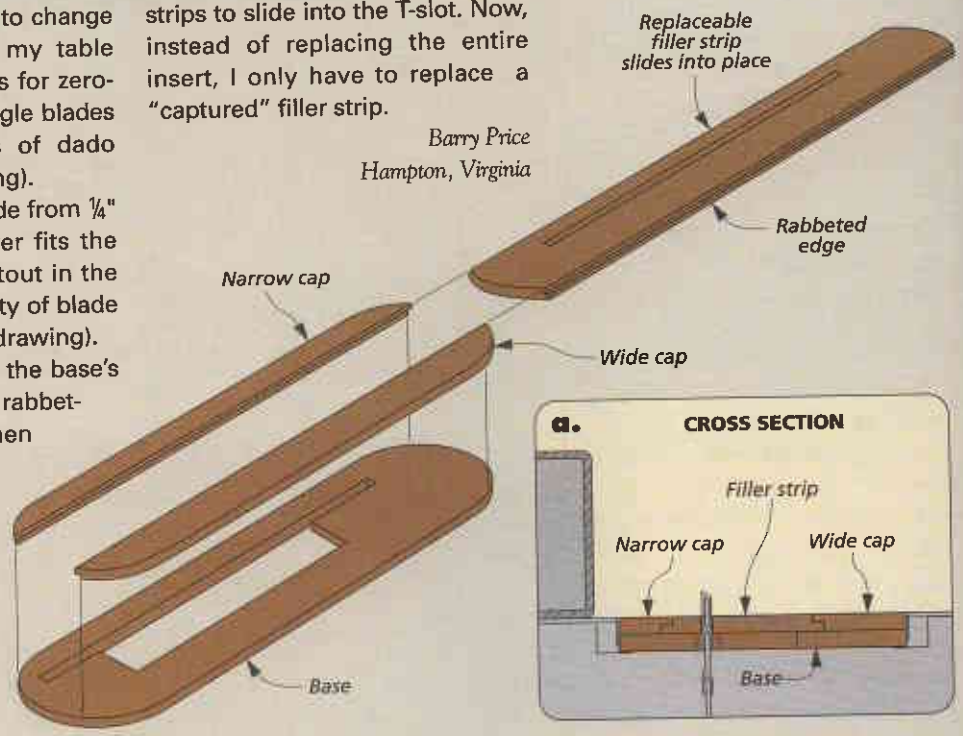
I wanted an easier way to change or replace inserts for my table saw. My solution allows for zero-clearance inserts for single blades as well as all widths of dado blades (see main drawing).

All the pieces are made from ¼" hardboard. A base layer fits the insert opening. The cutout in the base is sized for a variety of blade applications (see main drawing).

A pair of caps match the base's outside profile and are rabbeted to form a slot when attached to the base (see detail 'a'). I glued them to the base and made sure the slots were parallel to each other.

To accommodate different blade setups, I made filler strips to slide into the T-slot. Now, instead of replacing the entire insert, I only have to replace a "captured" filler strip.

Barry Price
Hampton, Virginia



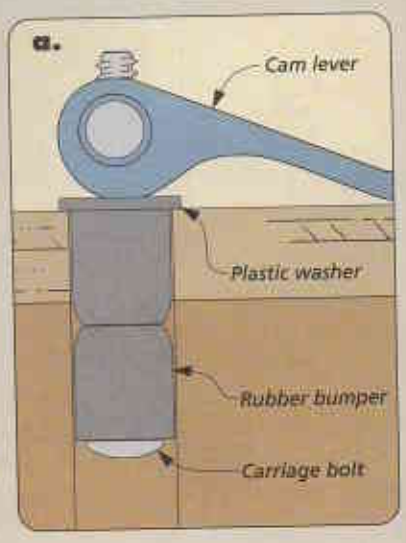
Bench Lockdowns for Your Machinist Vise

Clamps always seem to be in the way when I attach my machinist's vise to my workbench. I discovered a better way to lock the vise down by using cam levers and rubber bumpers in the dog holes of my workbench (photo below).

First, I made a mounting plate for my vise. I drilled holes in the plate to match the dog holes in my workbench. Then I inserted a carriage bolt through two rubber bumpers and screwed it onto the cam lever (see detail 'a').

When the cam lever is pushed down, it pulls the carriage bolt tight and compresses the bumpers in the dog hole. That provides a firm grip to hold everything in place. Flipping the cam lever up releases the grip of the bumpers, making it easy to lift the vise and plate right off the bench.

Wade Searcy
Lakewood, Colorado



Adjustable Height Outfeed Roller

Recently our pedestal fan quit working, and I hated to simply throw it all away. Since the stand had a height adjustment, I decided to use it to make an outfeed roller for my shop.

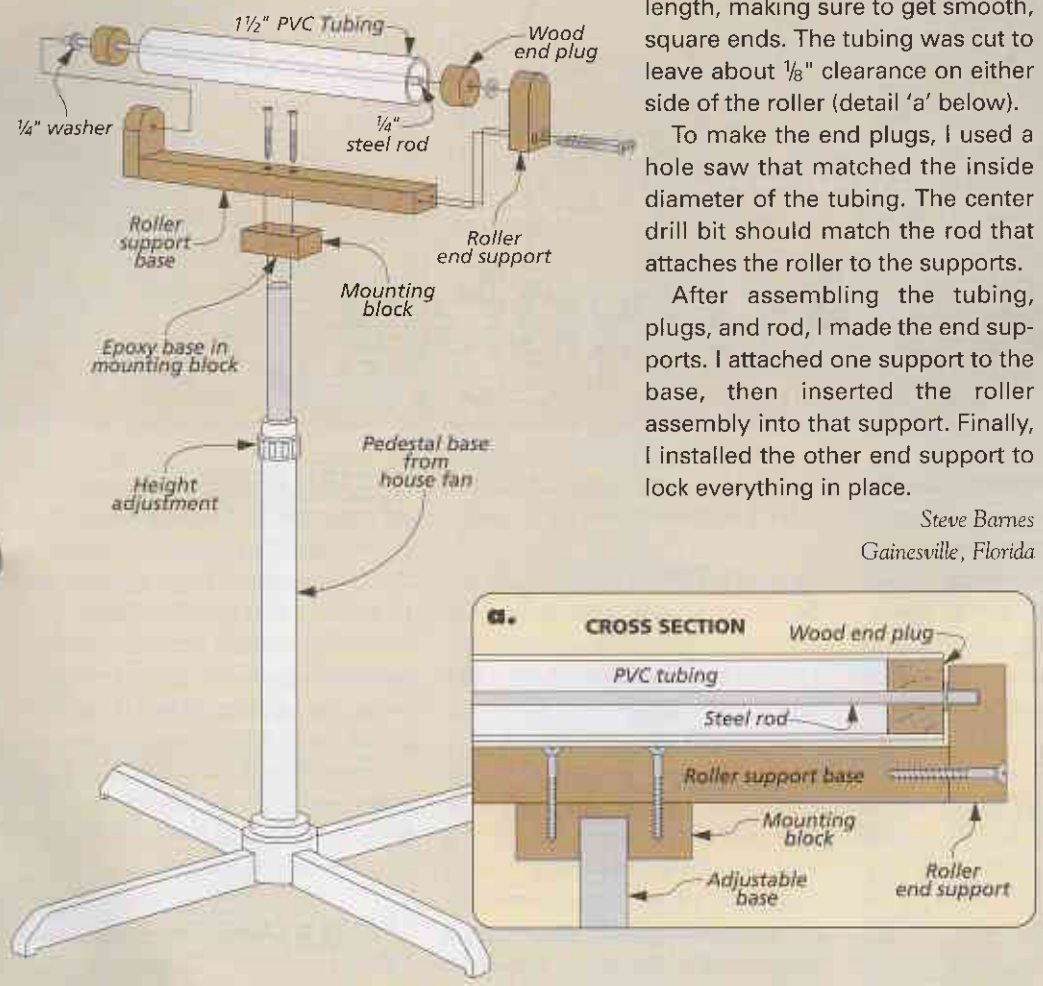
As you can see in the drawing below, I made the mounting block, roller support base, and roller end support out of 2x4 stock. I cut a hole in the mounting block so it would fit snugly around the shaft of the fan stand. To secure the block, I applied epoxy to hold the block onto the shaft. Then I screwed the support base to the block.

Next, I cut some PVC tubing to length, making sure to get smooth, square ends. The tubing was cut to leave about ⅛" clearance on either side of the roller (detail 'a' below).

To make the end plugs, I used a hole saw that matched the inside diameter of the tubing. The center drill bit should match the rod that attaches the roller to the supports.

After assembling the tubing, plugs, and rod, I made the end supports. I attached one support to the base, then inserted the roller assembly into that support. Finally, I installed the other end support to lock everything in place.

Steve Barnes
Gainesville, Florida



Quick Tips

DUST MASK STORAGE

I use a lot of disposable dust masks. But once the package is opened, the unused masks aren't really protected from dust.

Instead, I like to use is the plastic containers that hold 100 computer discs. Just remove the plastic spindle, and you have a perfect container to hold the masks.

William Straff
Philadelphia, Pennsylvania

BLUE TAPE STOP

Recently, as I tried planing edging down flush for a plywood cabinet, I cut through the veneer and had to replace the plywood.

To prevent that, I apply painter's tape next to the edging. I use this tape because it doesn't damage the wood or leave residue.

When I reach the tape, I simply peel it off and sand the remainder of the edging flush.

Bobby Nowell
Pampa, Texas

TONGUE DEPRESSOR SANDER

When I'm "detail-sanding," I like to glue sandpaper to tongue depressors. This allows me to shape them to suit the application.

One thing to remember, though, is to mark the grit number on the back of the tongue depressor.

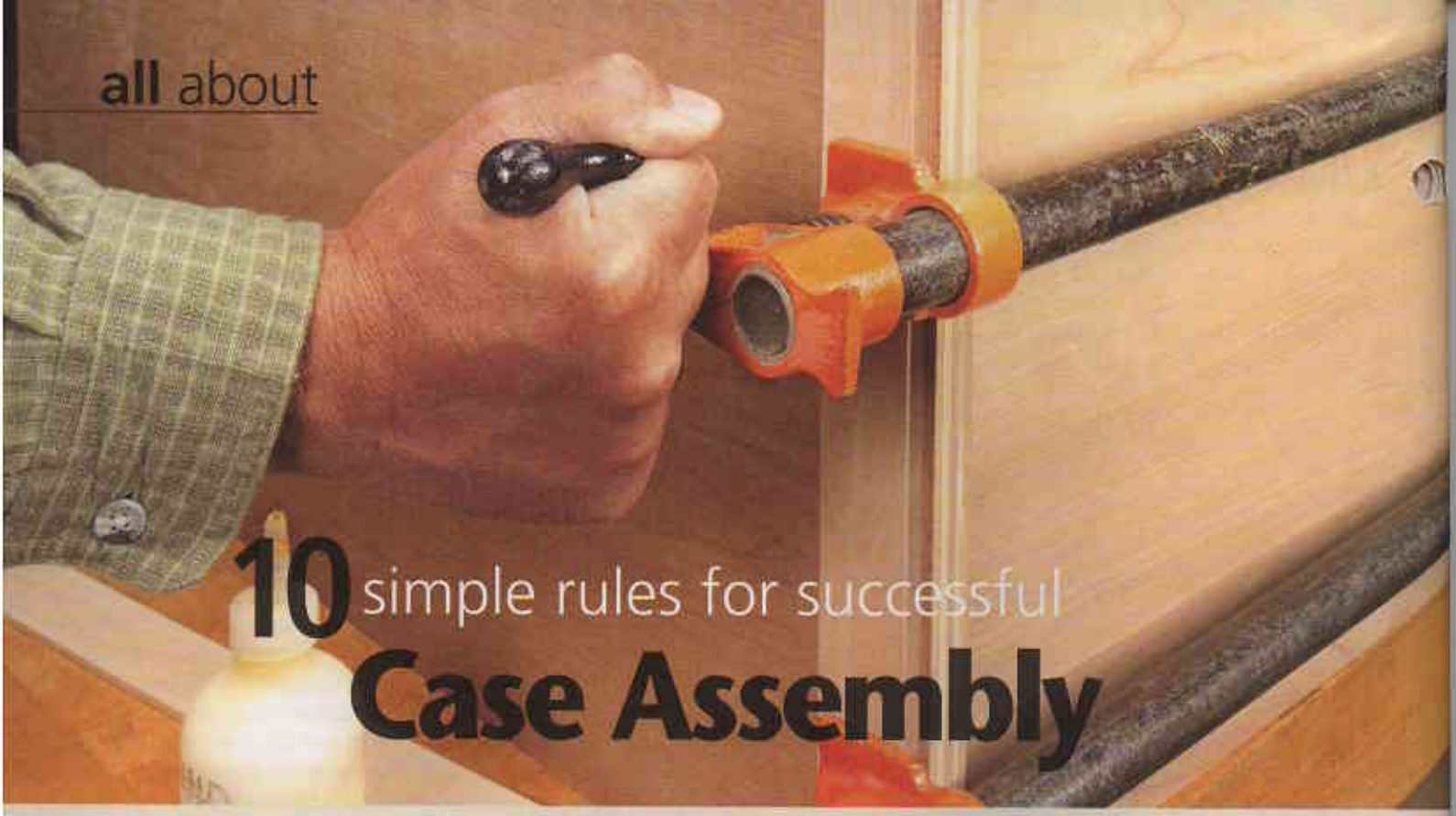
Bill Sauve
Lethbridge, Alberta, Canada

Win This Porter-Cable Variable Speed Router

That's right, send us your shop tips. If your tip or technique is selected as the featured reader's tip, you'll win a Porter-Cable variable speed router just like the one shown here. Send your tips and techniques to: *Woodsmith,* Tips and Techniques, 2200 Grand Avenue, Des Moines, Iowa 50312. Or send us an email message at: woodsmith@woodsmith.com.

Congratulations to Bill Esposito of Rindge, New Hampshire. His band saw blade tension lever was selected as the winner of the Porter-Cable router. His lever releases and returns the proper blade tension quickly and easily.

To find out how you could win a Porter-Cable variable speed router, check out the information on the left.



all about

10 simple rules for successful Case Assembly

When it comes to building a case for a project, cutting the joinery is sometimes the easiest part of the job. The challenge comes when you get out the glue and clamps for the assembly. So, at this point, I take some of the stress out of the job by making sure I follow a few simple rules.

1 THE RIGHT SPACE. You need to give yourself plenty of room to work. The key is to have clear access to all sides of the assembly. So whether you're working on the bench top or the floor, clear things out of the way and give yourself room. And don't forget to leave space for the clamps you'll need.

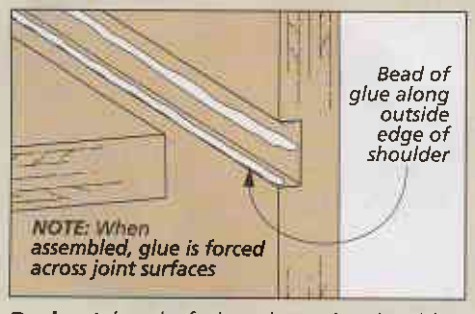
2 A DRY RUN. When cutting the joinery, it's easy to take the fit of some of the joints for granted. You figure if one fits, they all will. But before starting the assembly, it's a good idea to take a step back and do a test fit of *all* the joints.

One thing to remember is that glue makes the wood swell. If a joint is hard to assemble "dry," you'll really have a problem once the glue is applied. Shoot for a snug fit that's effortless to assemble.

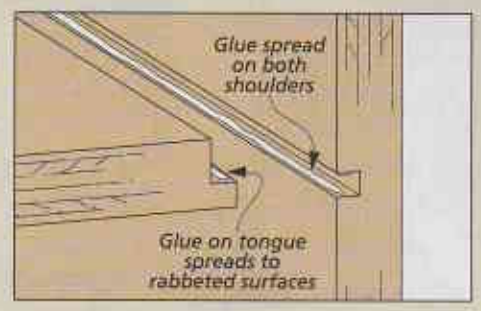
3 CLAMPS AT HAND. Sometimes it's difficult to know how many clamps you'll need for an assembly, and where the clamps should go to do the most good. If this is the case, the solution is to do a quick run-through of the clamp-up. This gives you a chance to gather the clamps you'll need, adjust them to the right length, and find the best position for them. And they'll be right at hand when you have glue in the joints later on.

4 PADS & CAULS. Clamping pads and cauls are important to a

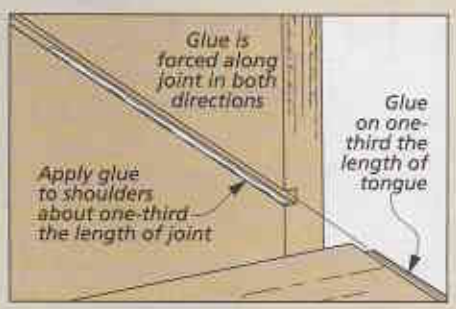
Shop Tip: Putting Glue in the Right Place



Dado. *A bead of glue along the shoulders and bottom of the dado will spread throughout the joint with minimum squeezeout.*



Tongue and Dado. *Put the glue along both shoulders of the dado plus a bead along the "rabbeted" side of the tongue.*



Adding a Divider. *When sliding a divider into a dado, apply glue only to the leading edges of both halves of the joint.*

successful assembly. If you don't have pads on the heads of your clamps, thin strips of wood will keep them from damaging the case. Cauls are heavier pieces and actually help distribute the pressure applied by the clamps, as shown in the photo at right.

Whichever you need for the job, have them ready and at arms length. You don't want to be running to the table saw to cut a caul to size as the glue is tacking up.

Here's a time-saving tip you can try. If you tape the strips to the workpiece (lower right photo), you won't have to hold them in place while trying to position a heavy clamp.

5 THE INSIDE STORY. Every once in a while, I'll catch myself starting an assembly before I've taken care of some of the "inside-the-case" details. This can be as simple as a little sanding or something more serious like forgetting to drill holes for shelf pins or hardware. It's better to double-check these details now than have to try to fix the problem later on.

6 IN STAGES. Whenever possible, I tackle large glueups in several stages. This lets you concentrate on assembling just a few joints at one time. It's a lot less hectic and I find that the job turns out better.

7 SLIDE INTO PLACE. And along the same lines, I find it's easier to add interior horizontal dividers last. You can simply slide them into place once the main case has been assembled. Again, it's a good idea to test the fit to make sure the joint doesn't bind *before* adding glue.

8 THE GLUE. The glue you put in the joints is what holds everything together. So it makes sense to think about where to put the glue and how much to use (the box on the opposite page offers a few pointers). Consider where glue will do the most good and also where it might cause hassles. Heavy squeezeout on the hidden part of a case isn't a problem, but where it will be seen is a different matter.

9 SQUARE IT UP. After applying the glue and tightening down the clamps, the next thing I do is check for square. And the best way to do this is by comparing opposite corner-to-corner measurements (photo below). If the two measurements are the same, you're assured the assembly is square. If this isn't the case, there are a couple things that I look at. First, see if the assembly is sitting flat. Then check your clamps (see box below).

The stout cauls used for this partial assembly are slightly bowed through the middle. This spreads the force of your clamps across the entire joint.

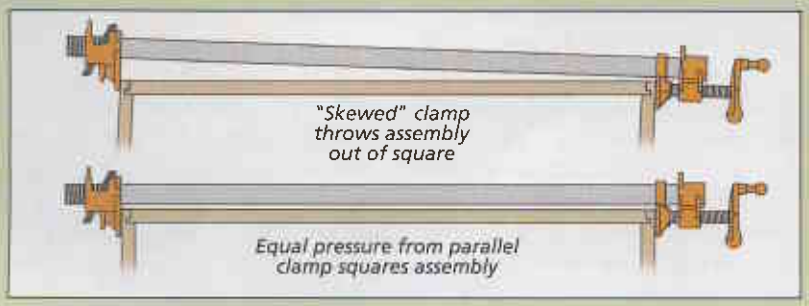
10 A ONCE OVER. Finally, it pays to give the assembly one last close look. Check to see that all the joints are pulled up tight and look for glue squeezeout that might need attention. Small beads of glue can be left to dry and then popped off later. But I do like to clean off any major squeezeout at this point.

After making sure the assembly isn't disturbed before the glue dries, I know that when the clamps come off, the results are a sure thing. W

How-To: Square a Case

When my corner-to-corner measurements (right photo) tell me that a case is out of square, the first thing I do is check the alignment of the clamps. As shown in the drawing below, a clamp that's "skewed" across the case exerts unequal force on the joint and distorts the case.

If you find a clamp that's misaligned, simply adjust its position so that it's parallel to the case and applying pressure directly over the joint, as shown in the lower drawing. Now take another set of corner-to-corner measurements, and the results should be better. But sometimes, you'll find that after realigning the clamps, the case will need a gentle push on one corner to persuade it into square.



Comparing opposite, corner-to-corner measurements is your best bet when checking a case for square. If the measurements are equal, you know the case is square.

get big results with a Small Router

Getting great results when you're routing doesn't have to mean hauling out a big, heavy router. Here's a new router that delivers top-notch results in a small package.

One power tool I use in my shop just about every day is a router. And I'd bet that's true for a lot of woodworkers. So if you're already making good use of a router (or two) in your shop, do you really need to consider a new one? Especially a small one?

Well, after running the *Colt* router (shown above) through its paces, I'd have to enthusiastically say, "Yes."

The reason for this is all the large-router features *Bosch* incorporated into the *Colt* that give you big-time results. Yet you still get the benefits of a small-sized router.

The *Colt* isn't limited to trimming laminate or routing simple edge treatments. You can increase its versatility by using an edge guide (included) and bits without bearings.

EASY TO CONTROL. At first glance, the *Colt* doesn't appear to be much different than a typical trim (or laminate) router (see main photo on opposite page). But it's on the inside that the differences start to show up.

For starters, it has a bigger motor (5.7 amps). So you'll be able to tackle more jobs than with a typical trim router. But even with the bigger motor, the *Colt* is still small and lightweight.

With one hand wrapped around the molded rubber grip, you can easily handle the router. And any time you feel the need for a little extra control, there are textured grips on the base you can use to steady the router (lower left photo).

The same photo also shows the handy edge guide you can use for even more support. Plus, it's a great way to make precision cuts using router bits without bearings.

FULL-SIZE FEATURES. But it's some of the other features that move the *Colt* up a notch. For starters, the Colt has a variable-speed motor that allows you to set the router between 16,000 and 30,000 RPM. All you need to do to change the speed is turn the dial on the top of the router (inset photo 1 on opposite page).

So what good is variable speed if you're not routing with large-diameter router bits? There are a few good reasons. First, running a bit at a slower speed will give you more control since the bit has less of a tendency to catch or "take off" on you. Second, a slower speed can help minimize any burning along the profile you're routing. And third, any time you slow a router down, it's simply more quiet and pleasant to work with.

And once you start routing, the electronic feedback built into the *Colt* ensures that the router will maintain the speed you've set — even under a heavy load. The end result is smoother, cleaner cuts.

Finally, there's the soft-start feature. Instead of the zero-to-full-speed jerk you usually experience when you turn a router on, the motor gradually and smoothly revs up to the speed you've set.

IMPROVED HEIGHT ADJUSTMENT. These aren't the only new features to like on the *Colt*. As with any router, you'll spend a fair amount of time adjusting the height of the bit. So you want to be sure you can do this quickly *and* accurately.

With older trim routers, this was an "either-or" proposition. You could either change the bit height quickly, with limited accuracy, or you could change it accurately, but it would take more time and effort. With the *Colt*, you get both.

To do this, the base features a unique two-position mechanism for adjusting the bit height. You start by flipping open a clamp on the side of the router to unlock the base (see main photo at right). Then, for a large depth change, twist the base to unlock it from the thumbwheel (inset photo 2). This allows you to slide it up or down quickly and easily.

Once you have the depth of cut set roughly where you want it, twist the base back to re-engage the thumbwheel. This way, you can make fine adjustments (inset photo 4). All that's left is to flip the clamp back to lock in the setting.

CHANGING THE BIT. Adjusting the height of the bit quickly and accurately is important. But the ease with which you can change a bit is just as important, especially if you swap router bits frequently.

The open base provides easy access so you can use the spindle lock and wrench to loosen the collet (inset photo 3). Or you can just as easily remove the whole base. Simply slide the base all the way down, and then give it a slight twist.

PRICE & AVAILABILITY. You might think that with all the *Colt* has going for it, it's going to cost you nearly as much as a full-size router. But that's not the case. The model featured here (PR20EVS) runs about $120. (Refer to page 49 for sources.) Be sure to check out the box below for another small router with similar features.

So if you're thinking about getting a new router, or even buying your first one, these small routers should get serious consideration. Despite their size, they deliver big results.

New to small routers is the variable-speed feature. This makes it easy to set the speed to match the bit, material, and task at hand.

To make big adjustments in the depth of cut, rotate the base to the unlocked position and simply slide it close to where you need it.

Once the spindle lock is engaged, the *Colt* only requires a single wrench, which makes changing the bit a snap.

After relocking the base, you can fine-tune the depth of cut by turning a small thumbwheel at the bottom of the base. Then simply snap the base clamp in place.

What's New: The Competition

Bosch isn't the only player in the small router arena. The *Ridgid R2400* shown at right has many of the same features as the *Bosch Colt* — like variable speed (20,000 - 30,000 RPM), electronic feedback, and a bigger motor (6 amps).

But there are a couple differences worth mentioning. For starters, you may find setting the depth of cut a little more frustrating. The reason for this is that the base doesn't feature a fine-adjust mechanism. *Ridgid* uses a rack and pinion depth adjustment, but I wasn't able to finely tune the setting with much success. Also, you'll have to spend time keeping track of two wrenches any time you want to change a bit.

Still, you get the most important features for right around $100. And *Ridgid* throws in a small flush trim bit, roller bearing guide, and edge guide as standard equipment.

For sources of the new *Ridgid R2400*, turn to page 49.

Like the *Colt*, the *Ridgid* R2400 has new features along with a number of handy accessories for a small price.

get a flawless fit

Mitered Molding

The right process and a little tweaking on the table saw are all it takes to get top-notch results when trimming out a project.

In a perfect world, attaching molding to a cabinet would be easy. Just miter the ends and glue it in place. Unfortunately, that's usually not the way it goes. Too often, I'll end up with a small gap in the miter joint.

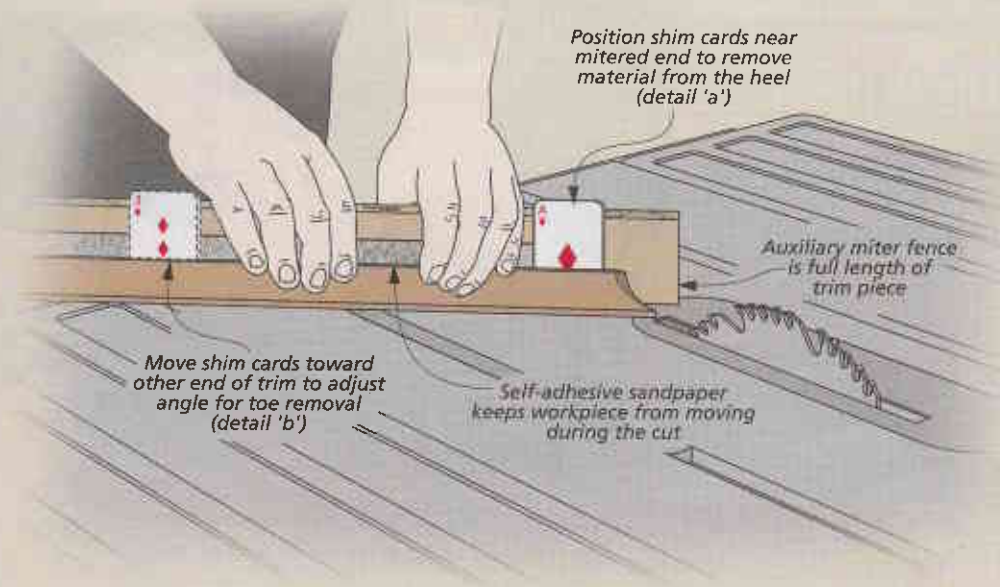
When fitting molding to a cabinet, there are two things to think about: cutting it to the right length and fitting the miter joints. If either of these two are off, even just a hair, the error will really stick out.

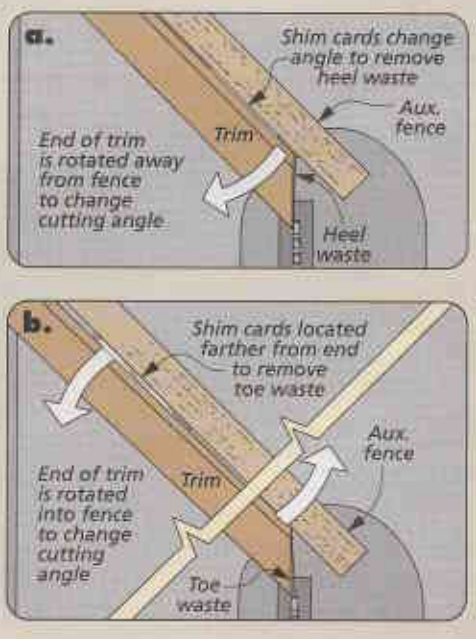
The way to get a flawless fit is to use the right technique. The one I use addresses both aspects, one at a time. I start by fitting the miters. Only then do you cut the pieces of molding to final length.

SETTING UP YOUR SAW. Before jumping in and actually cutting the molding, it helps to take a few minutes to get your table saw ready. Here, you'll want to do two things. First, check the 45° setting for cutting the miters. You can do this by either making a test cut and checking the angle or by using a plastic drafting triangle to set the miter gauge.

AUXILIARY FENCE. Another thing I like to do is add an auxiliary fence to the miter gauge. This supports the molding during the cut (drawing below). And if you extend the fence past the blade, it will prevent tearout.

When cutting miters, I've experienced the workpiece "creeping"





during the cut. This spoils the accuracy. An easy fix for this problem is to stick a piece of self-adhesive sandpaper to the fence face.

FITTING THE MOLDING

Once you have the saw set up for precision cutting, you're ready to begin. You'll find an overview of the process in the upper drawing on the opposite page and in the box below.

The work will go in two steps. First, the miter joints will be cut and fit. Then, the parts will be trimmed to length and glued to the cabinet.

FITTING THE FRONT MOLDING. The first step in the process is basic mitering. Here, I start with extra-long pieces to allow for fine-tuning the joint. I miter the front end of the two side molding pieces and *both* ends of the front molding piece.

From here, you'll work on fitting each miter joint, one at a time. To do that, I pick up one of the side pieces and clamp it in place on the cabinet (left drawing below). Then I butt the end of the front molding up to it. Ideally, there shouldn't be any gaps along the length of the joint line.

If there's a gap, you can close it up by "tweaking" the miter on the table saw. For me, it's too much of a hassle to adjust the miter gauge by such small amounts. So I leave it set at 45° and grab a few playing cards to shim the workpiece. The lower drawing on the opposite page shows you how. You want to take it slow here and test the fit often.

After getting one miter joint tight, it's time to work on the miter joint on the other side of the case. So rotate your miter gauge around and grab the other side molding piece. Then clamp it in place and repeat the steps for the first joint.

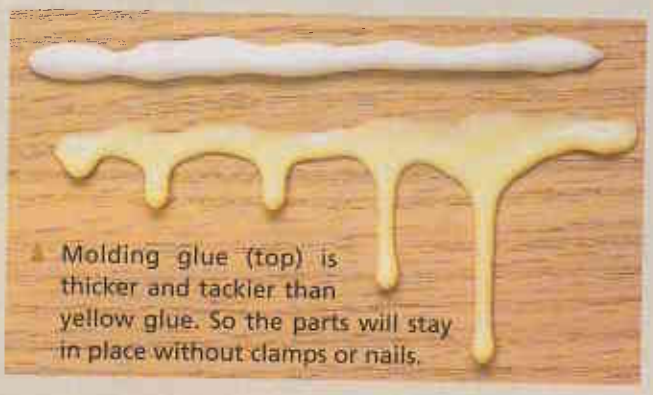
CUT TO LENGTH. At this stage in the game, all the miters fit perfectly. The only thing is, all the pieces of molding are too long. The next step is to cut the parts to length.

To avoid any measuring errors, I mark the length of each part directly on the workpiece. For the front piece, I again clamp a side piece in place and butt the mitered end up to it. Next, I'll pick up a pencil and mark the length on the opposite end (middle drawing below). And with the same shim setup used earlier, you can sneak up on the final length, knowing the fit will be perfect.

ATTACHING THE FRONT MOLDING. Before cutting the side pieces, I like to attach the front molding. To register the front piece, I make sure to have both side pieces clamped to the case. I prefer to glue the pieces in place with "molding" glue, as in the box above.

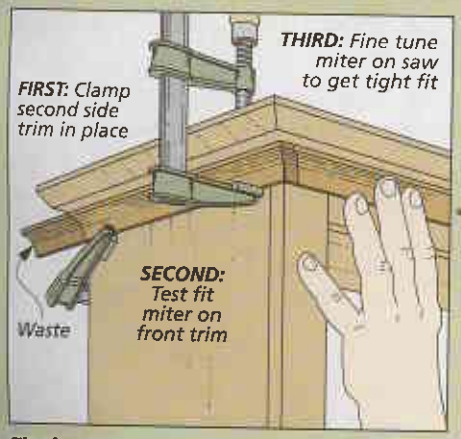
Once the front is attached, the side pieces can be marked for length and the ends trimmed square. Before attaching each side piece, I apply a dab of glue to the miters. Now, the trim is complete and you can step back and admire the flawless fit. W

Shop Tip: No Drip Molding Glue



Molding glue (top) is thicker and tackier than yellow glue. So the parts will stay in place without clamps or nails.

How To: Fitting the Molding



Fit the Joints. *One at a time, check the fit of the front joints. Fine tune the fit of the joints on the table saw using shims.*

Mark Length of Front. *Once the joints are fit, mark the length of the front piece by placing it in position on the cabinet.*

Attach Front First. *With the end pieces clamped in place, glue the front to the cabinet. Then cut the sides and glue them on.*

Veritas Mk. II

Honing Guide

Razor-sharp tools — this new, two-part honing system makes it fast and easy. Plus, you'll end up with a perfect bevel every time.

Like training wheels on a bicycle, a honing guide makes it easy to put a fine edge on a blade — even if you've never done any sharpening before. By holding the blade at a consistent angle throughout the process, a honing guide almost guarantees that you'll end up with a flat bevel every time. From this standpoint, honing guides work great.

But getting a flat bevel is only part of the battle. You also want a bevel with a consistent width. And most important of all, you want to make sure that you are sharpening the blade at the correct bevel angle.

With many honing guides, all of this is a matter of trial and error. You typically have to set the blade in the honing guide, place it on your sharpening stone, and simply eyeball the bevel angle. Then after sharpening a bit, you move the blade forward or back to adjust the angle.

If the bevel is wider at one end than the other, you have to cock the blade slightly to the left or right to compensate. It's not unusual to spend more time setting up the honing guide than you do sharpening. And that's exactly why I was anxious to give the new *Mk. II Honing Guide* from *Veritas* a test drive in my shop (see photo above).

TWO-PART DESIGN. This particular honing guide actually consists of two separate components — a blade carrier and a registration jig (see photo at left). The blade carrier is really nothing more than a holding device. A clamp bar holds the blade in place and a wide, machined roller allows the carrier (and your tool) to travel back and forth over the surface of a sharpening stone, creating a keen edge.

REGISTRATION JIG. But what really make this jig stand out is the registration jig. It makes honing a perfect bevel at a precise angle on a chisel or

plane iron virtually foolproof. It's an extremely well-thought out design.

HOW IT WORKS. To set up the honing guide, the registration jig slides onto the front of the guide and clamps in place with a knob. When you place a chisel or blade into the guide, the blade butts up against an adjustable stop on the jig. This places the blade at just the right position for sharpening the desired bevel angle.

There's also a fence machined into one edge of the registration jig to automatically square up the blade with the honing guide. This way, you end up with an even bevel across the entire width of the tool.

Once the clamps holding the blade are tightened down, the registration jig slides off the end of the honing guide so you can start sharpening. (For more on setting up the guide, see the photos in the box below.)

ADJUSTABILITY. In order to give you a wide range of possible bevel angles, the blade carrier on the honing guide can be adjusted to one of three color-coded positions (for low, medium, and high bevel angles). Once you set the blade carrier, you can then select your desired bevel angle by moving the adjustable stop to one of several index holes on the registration jig, which are color-coded as well. In this way, you can sharpen a blade to one of any number of bevel angles, ranging from 10° to 54°.

USING THE GUIDE. When it came down to actually using the *Mk. II* to sharpen a few tools around my shop, I have to say that it performed flawlessly. Although setting up the guide may sound complicated at first, after a couple of times it becomes second nature. And the instructions that come with it are easy to follow.

The blade carrier is large enough to allow you to get a good grip, and there are convenient places for you to rest your fingers and thumbs. There's even a feature on the roller that allows you to hone a micro-bevel (see box at right).

The clamp bar holds both plane irons and chisels tightly, provided that the blade is centered in the blade carrier. To make this easier, a scale is cast into the front of the blade carrier to help you position the registration jig according to the width of your blade. This automatically centers the tool in the blade carrier.

Speaking of blades, the *Mk. II* can handle blades up to $2\frac{7}{8}$" wide and $\frac{15}{32}$" thick. And that covers just about every edge tool in my shop.

The only drawback that I can see is that the *Mk. II* is just a bit too large and heavy to make honing the back of the tool convenient — unless you remove it from the guide altogether. But this is a minor quibble.

SOURCES. You can purchase the *Mk. II Honing Guide* directly from *Lee Valley* or several other retail suppliers. (For more information, see sources on page 49.) And at just under $50, it's probably one of the best investments you can make when it comes to sharpening. W

Extras: Micro-Bevel

Many woodworkers like to add a small, secondary bevel to the edge of the primary bevel when sharpening a blade. This micro-bevel makes it easier and quicker to touch up the edge as it starts to dull.

With the *Mk. II*, adding a micro-bevel only requires a flick of the wrist. The roller rides on a shaft that is mounted eccentrically in the honing guide (see drawing below). By turning a spring-loaded knob at the end of the shaft (see photo below) you can change the position of the roller, which in turn raises the blade slightly. This allows you to hone a micro-bevel of 1° to 2° on the leading edge of the blade.

After honing the primary bevel, just turn a knob on the end of the shaft to add a micro-bevel.

How-To: Setting Up the Mk. II

Set the blade carrier to one of three positions for low, medium, or high bevel angles.

Move the stop to the index hole that corresponds with your desired bevel angle.

Slide the registration jig onto the front of the blade carrier and tighten down the knob.

Slide the blade into the blade holder until the edge contacts the stop on the registration jig.

inlay Marquetry Box

Create a keepsake box with your own decorative style. A few easy steps are all it takes to build this simple box.

▼ For a different look you can make the box with a figured wood top — like the spalted maple shown below.

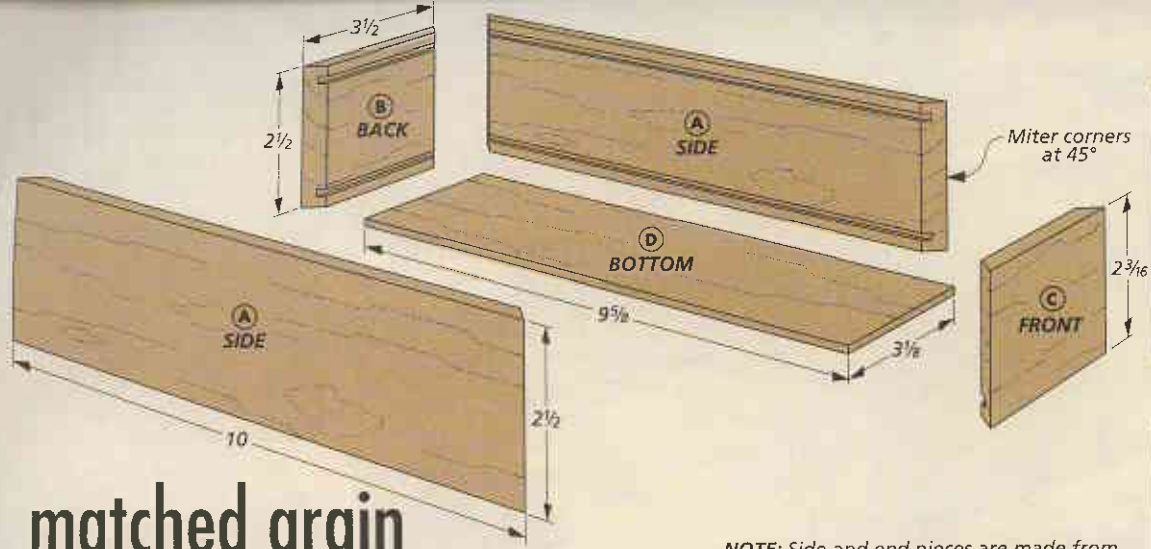
Building small projects, like the inlay marquetry box you see in the photo above, can be a nice change of pace. These projects are challenging, but still quick to build. And they're really quite rewarding.

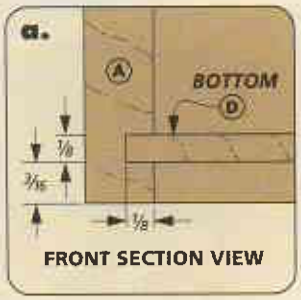
It's also a good way to use up some of the scrap wood that accumulates in your shop. You might also want to use a combination of woods and create a totally different look, like the spalted maple top on the box you see in the photo at left.

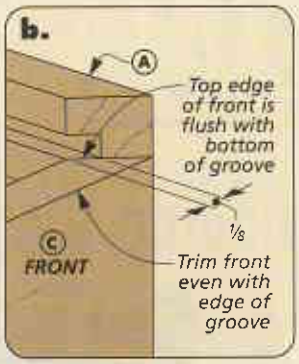
Another great thing about building boxes is it gives you a chance to try new techniques, like the marquetry I used on the lid. I was able to develop a new skill that can be used on future projects.

Best of all, this marquetry technique is easy to do. All it takes is a scroll saw and a few simple steps to add a unique look to any project. If you like working with different kinds of wood, you'll definitely want to give this scroll saw technique a try.

You'll find all the information you need to add the marquetry later. But first you'll need to build the box.







matched grain Box Sides

NOTE: Side and end pieces are made from hardwood planed to 5/16" thick. Bottom piece is planed to ⅛" thick.

Building the box is nothing more than making four sides, a bottom, and a sliding top. It's simple, but there are a few things to consider.

MATCHING THE GRAIN. One way to enhance the look of the box is to make sure that the grain pattern runs continuously around all four sides. Now, I know this sounds difficult. But it's a simple band saw technique.

You start with a thick blank and resaw it into matching pieces that you'll use to make the box parts. The box below shows how it works.

There's another thing to consider. I cut enough stock to make one extra front piece. This piece will be used to make the lid pull later on.

After resawing, plane the two pieces to 5/16" thick. You can find more about planing thin stock on page 30.

CUT THE GROOVES. Next, you'll need to cut a couple of grooves to hold the lid and bottom (details 'a' and 'b'). A trip to the table saw makes this easy. Just set the blade depth to ⅛" and your rip fence 3/16" away from the blade. Then make a pass along the top and bottom of each piece.

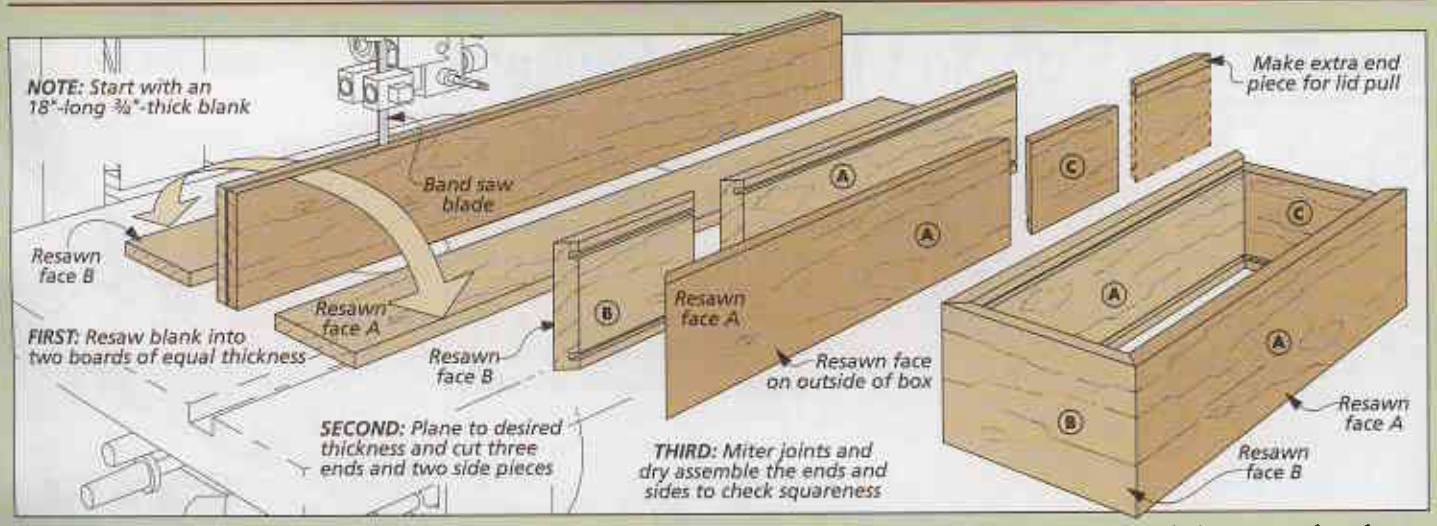
Next, cut the pieces to rough size. I cut the smaller back and front pieces before cutting the sides.

MITER THE CORNERS. I joined the sides and ends together with miter joints. To make these joints, simply tilt the blade of your table saw to 45° and miter the pieces to final length.

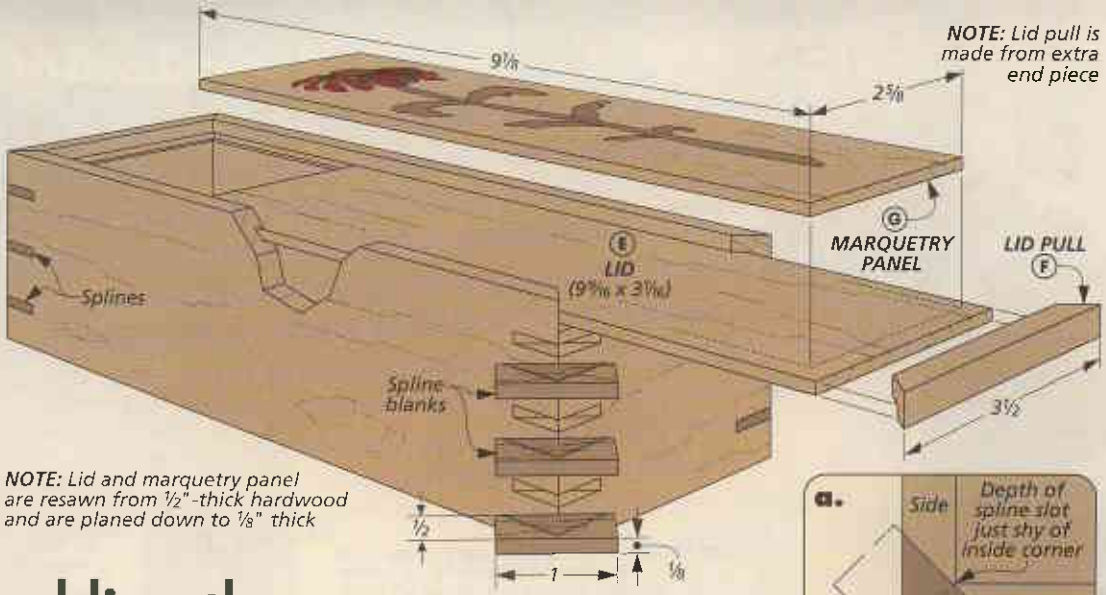
Finally, you'll need to plane a piece of stock to ⅛" thick for the bottom of the box. Then cut it to size.

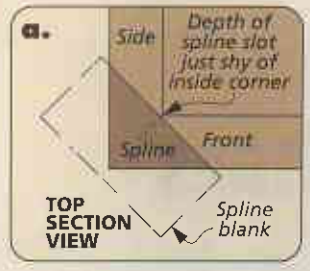
Before gluing the box together, trim away the top edge of the front at the level of the top groove as shown in detail 'b'. This allows the lid to slide in and out easily.

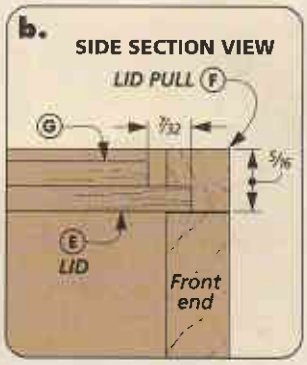
How-To: Continuous Grain Sides and Ends

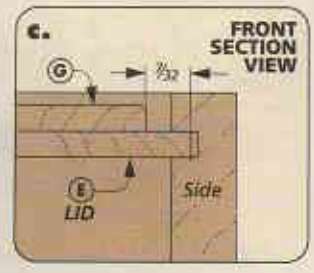


Grain Matching. *Begin with a blank a little longer than the length of one side and two box ends. Then use the band saw to resaw the board into two pieces that are roughly the same thickness. After planing each piece to final thickness, mark the resawn face for use as outside faces of the box. Then cut the ends and sides from each of the pieces. Complete the joinery and dry assemble the box.*









adding the SPLINES AND LID

To complete the box, I first added some splines to the miter joints. And then I made a lid that slides in place to enclose the top of the box.

SPLINES. Adding splines to the miter joints does two things. First, they increase the strength of the miter joints. But just as importantly, they dress up the appearance of the box.

CUT THE SLOTS. To cut the corner slots for the splines, you'll need to build a simple jig, like the one shown in the box below. You can find more about building and using the jig on page 30.

After cutting the slots, you're ready for the easy part — adding the splines. I made the splines from pieces of ⅛"-thick walnut. To make them, simply cut the pieces 1" long and then glue them into each slot as shown in the drawing and detail 'a.'

After the glue dries, you can trim off the "ears" with a hand saw, as shown in the lower right drawing. Then, just sand the splines until they're flush with the sides.

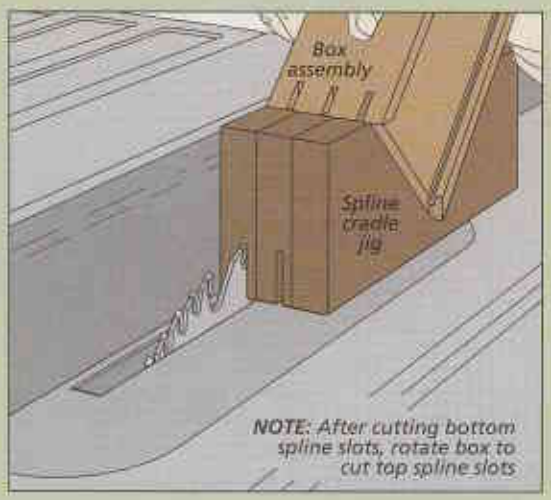
MAKE THE LID. At this point, you're ready for the two-part lid. The first part is a piece of stock planed to slide easily into the top groove. And then a second panel is attached to the top of the lid (detail 'c'). The article on the opposite page shows you how to add marquetry to this panel before attaching it to the lid.

ADD THE LID PULL. The final thing you'll need to do is make a pull for the lid. The extra front piece I made earlier makes this step easy.

All you need to do is trim the top of this front piece off at the bottom of the groove. Then glue the pull to the end of the lid as shown in the main drawing and detail 'b' above.

Now all that's left is to add a few coats of finish to the box. Then after slipping the lid into the top groove, your box is ready to use. W

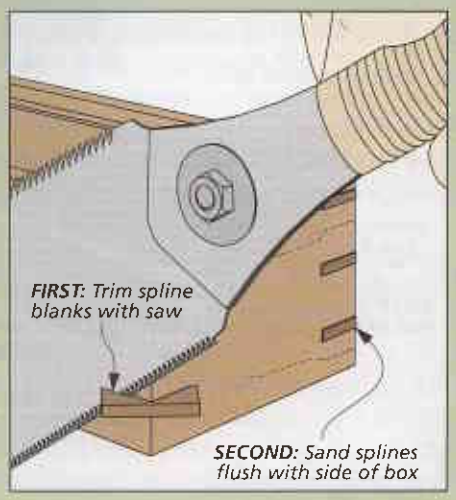
How-To: Cut Slots and Trim the Splines



To safely cut the slots for the splines on your table saw, you'll need to make a simple jig. The jig cradles the corner of the box at a 45° angle so the slots can be cut on the table saw.

The jig is made from pieces of MDF that are glued together. A notch is cut out to hold the corner of the box at the correct angle.

After the slots are cut, you can glue in the hardwood splines. You'll want to trim them slightly proud with a handsaw so you don't scratch the side of the box. Then just sand them flush with the sides.



Trimming the Splines. *A Japanese saw makes it easy to trim the splines slightly proud to the side of the box.*

Scroll Saw Marquetry

A picture in wood is what you get when you add marquetry to a project. And it's actually easier than you might think.

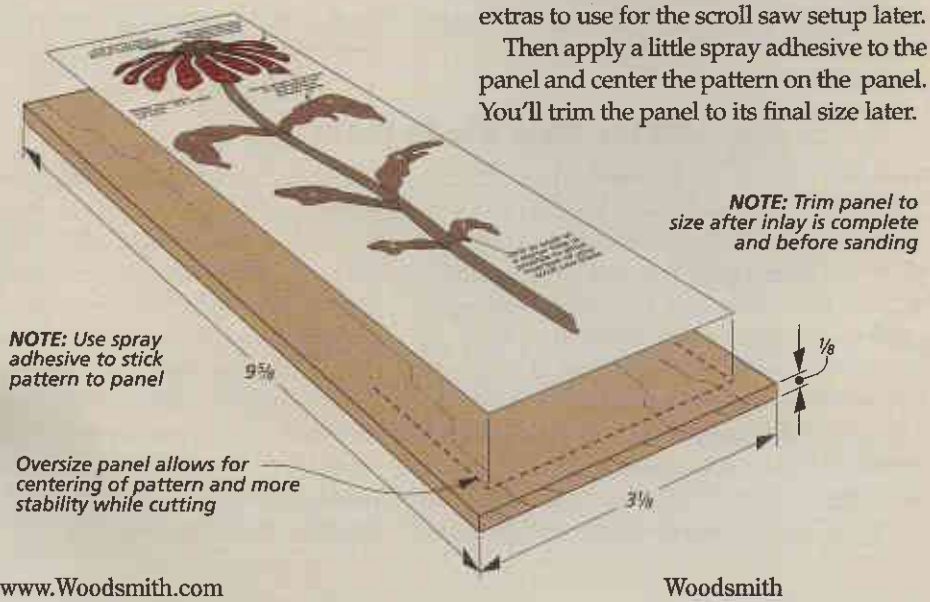
The marquetry technique I used on the box lid involves cutting out a pattern on the panel and then replacing the piece with small inlays of other kinds of wood to form a design or picture. All you need is a scroll saw, some small pieces of wood, and a bit of patience. By following a few simple, steps you can give your project a custom look.

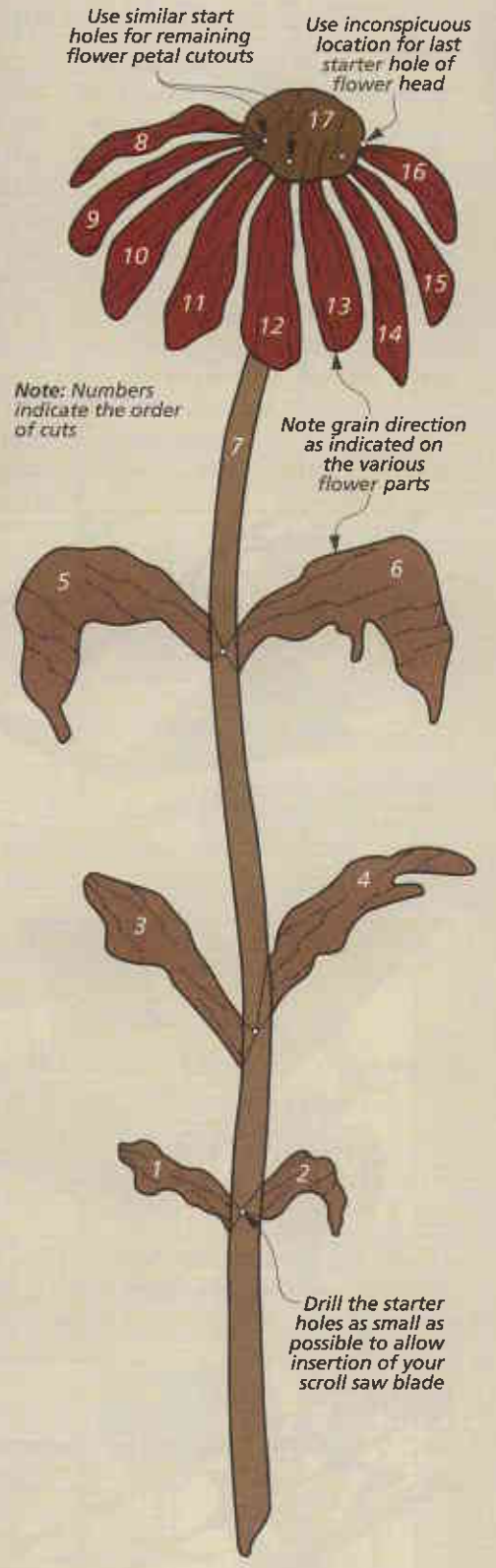
1 Pattern Setup

One of the first things you'll need to do is choose a marquetry pattern. They're available from many veneer suppliers and woodworking stores. You can also use almost any illustration, or do like I did and design your own pattern.

Next, I prepared the panel by planing a piece of oversized stock to 1/8" thick. You'll also need several different species of wood for inlays. These pieces should be the same thickness as the panel. So this is a good time to plane your inlay stock pieces to 1/8" thick as well. You'll want to make a few extras to use for the scroll saw setup later.

Then apply a little spray adhesive to the panel and center the pattern on the panel. You'll trim the panel to its final size later.





Marquetry Pattern. *Copy this flower pattern on your copier. Then apply spray adhesive to the panel and center the pattern.*

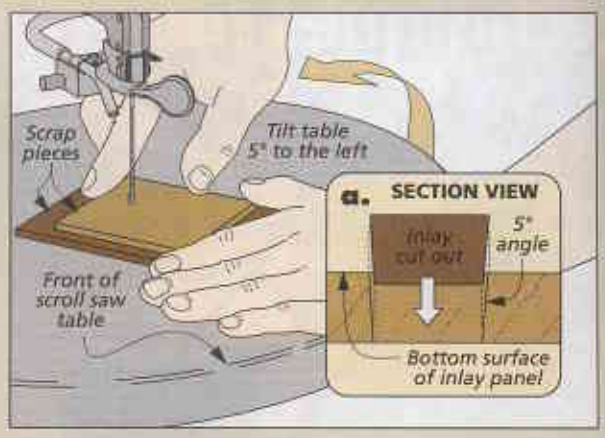
2 Scroll Saw Table Setup

The key to this technique is taking a few minutes to set up your scroll saw properly and make some practice cuts. That way, you can be sure the inlays will fit just right.

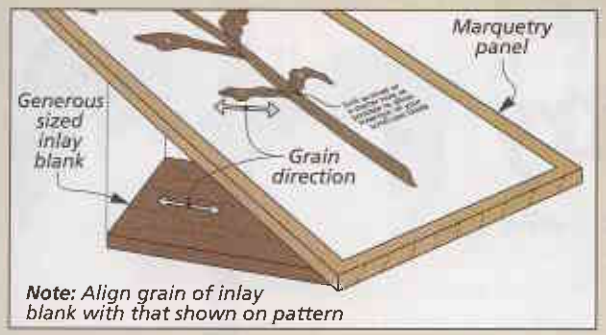
Because you'll be cutting the panel and the inlay at the same time, you can't simply cut around the pattern and expect the inlay to fit. That's because as the saw blade cuts, it creates a narrow kerf. So if you cut around the pattern without accounting for the kerf, the inlay will always be smaller than the opening.

To avoid this problem, you can simply angle the work table of the scroll saw. This way the inlay piece will be cut slightly larger so that it fits into the opening like a wedge (see detail at right). Then when you glue it in place it'll fit tight and flush.

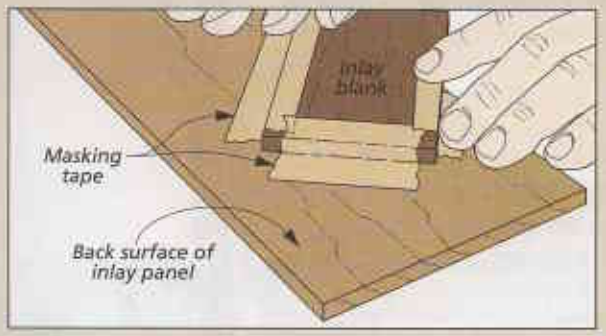
This angle will vary depending on the thickness of the stock and size of the blade you're using to make the cut. So you'll want to make a few test cuts to find the angle that works best for your panel. An angle of 5° worked well for the panel I made.



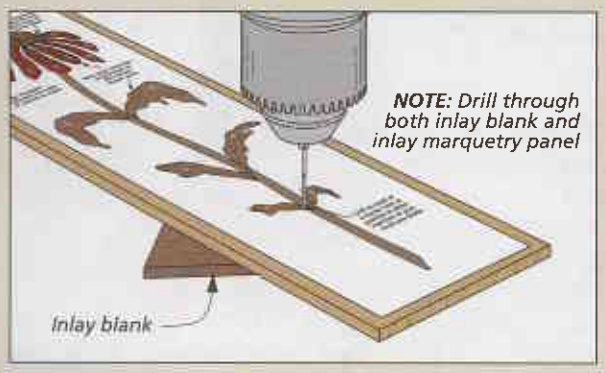
Setting Up Scroll Saw Table Angle. *You can make a few trial cuts to ensure that the angle of the table is able to compensate for the kerf made by the blade.*



Orient Grain Direction. *Make sure grain direction of inlay piece matches that shown on the pattern.*



Secure the Blank to the Panel. *Use masking tape to secure the oversized inlay blank to the underside of the marquetry panel while the cut is made.*



Drilling Starter Hole. *Drill a hole through the panel and inlay blank just large enough for the scroll saw blade. Position the hole where it will be cut out later.*

3 Placement of Inlay Blank

At this point you're ready to start cutting the inlays. But before you make any cuts, there are a few things you want to think about. A little bit of planning here will really make a difference in the appearance of your marquetry project.

Inlay Color. First, I spent some time picking out the wood to be used for each part of the marquetry. The idea is to choose wood that has the right contrast and color to accent the pattern you've chosen. For the flower design used on this panel, I chose to use a dark wood (walnut) for the stem and a slightly lighter wood (mahogany) for the leaves.

I wanted to be sure that the petals of the flower really stood out on the panel, so I used an inlay of dark bloodwood for this part. A piece of cocobolo provided a great contrast for the head of the flower.

Grain Orientation. The second thing is to orient the grain so it provides a natural flow and direction to the inlays. You'll notice the grain of the walnut stem is oriented vertically to accent the way the stem would grow. And the grain in the leaves is angled in an upward direction. The the petals need to droop down so I angled the grain of the wood to follow the shape of the petals.

Secure the Blank. It's a good idea to use a generous-sized blank for your inlay. That way, you'll be sure to cover the entire cutout area.

Once the inlay is positioned correctly on the bottom of the panel, you can tape it down. This will hold the blank securely in position as you make the cut with the scroll saw. You'll find masking tape works great for this. Just secure it like you see in the middle illustration at left.

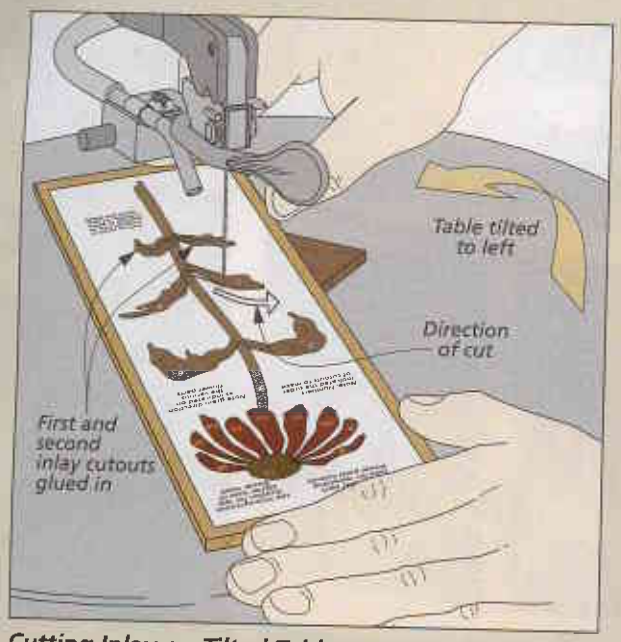
4 Starter Hole Blade Insertion

Now that you have the inlay blank secured to the bottom of the panel, you can turn both of them face up again. The next step is to drill a small entry hole for inserting the scroll saw blade into the panel.

The size of the saw blade you're using to cut out the inlays determines the size of hole you'll need to drill. Since I used a #5 scroll saw blade to cut out my inlays, I was able to use a 1/16" drill bit for the entry holes.

If you can, try to position the entry point in a place that will be cut away later (see pattern on page 19). This way, you won't have holes that need to be filled when you're finished.

When you drill the hole, be sure to drill through both the panel and the underlying inlay piece (see drawing at left). Now you can slip the blade through the entry hole, attach the blade to the scroll saw, and get ready to cut out the first piece.



Cutting Inlay on Tilted Table. *To get the best inlay fit, make sure the part you cut is positioned on the "uphill" side of the blade and moved in the correct direction.*

5 Cutting First Inlay

There are a couple of things to remember as you make the cut. First, if you angled the table to the right, make the cut in the clockwise direction. And if it's angled to the left go counterclockwise.

You'll also want to keep the part you're cutting out on the "uphill" side of the table. That way the inlay piece will always have a wedge shape and fit perfectly when you insert it into the back of the panel.

I also try to cut on the inside of the line. This leaves you some extra room in places, like the petals, where the lines are close together.

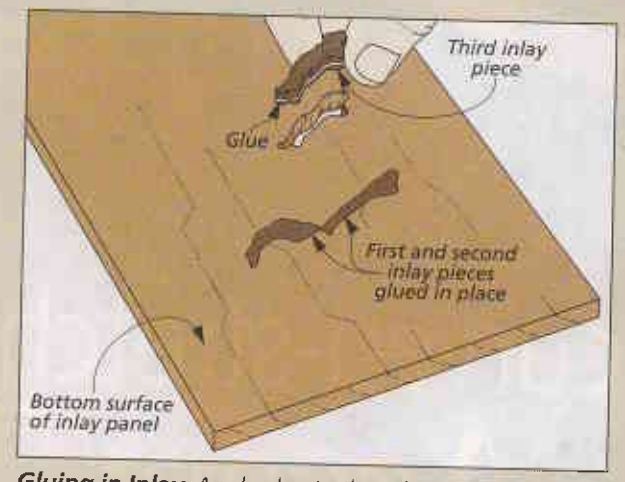
After making the cut you'll have two pieces. Just separate the pieces and dry fit the inlay piece into the void in the panel.

6 Gluing Inlay

I like to glue the pieces into to the panel as I go. This keeps the panel strong and rigid as you make each of the cutouts.

This is especially important when you make the cutouts for the flower petals. Since the petals are so close together you want to replace the cutout with inlay material to keep the thin fibers of the wood between the petals from breaking apart.

Now, you can move to the next inlay part and cut it out using the same procedure. Continue until all the inlays are glued in place.



Gluing in Inlay. *Apply glue to the edges of the inlay, slip it into position from the back side of the panel, and hold it in place until the glue dries.*

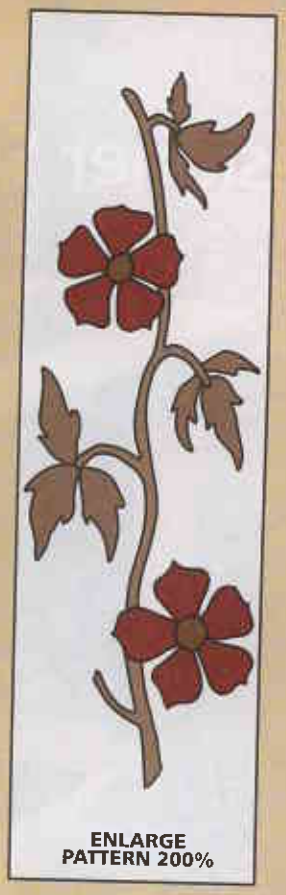
Final Starter Hole. *Since you won't be able to cut away this entry hole, choose a spot that will show the least and then fill it with some wood filler when you're done.*

7 Final Starter Hole

You'll need to drill one last hole to cut out the final part. Since you won't be able to cut away this entry hole, try to pick a place that will show the least. Then simply use a little matching wood filler in the hole before you finish the panel.

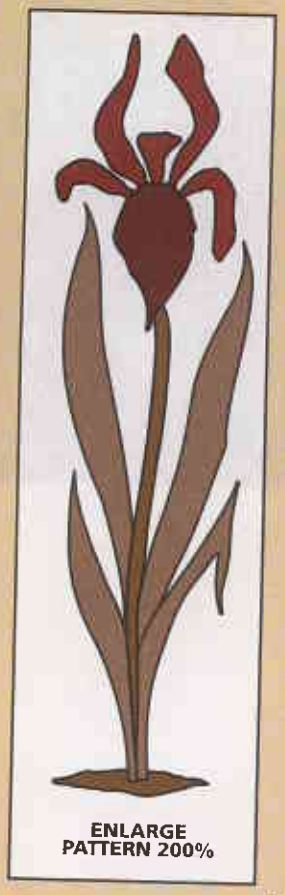
Once all the inlays are glued in place, you can sand away the pattern. You'll also want to sand everything flush with the panel.

Finally, cut the panel to size and then glue it in position on the lid. Then all that's left is to add your choice of finish to the panel. W



Woodsmith GO ONLINE EXTRAS

To find full-size versions for all three marquetry patterns, go to: www.Woodsmith.com



Designer Series Project

curved-stretcher Accent Table

Bending wood — it's easier than it looks. And this project is a great way to perfect your bent lamination skills.

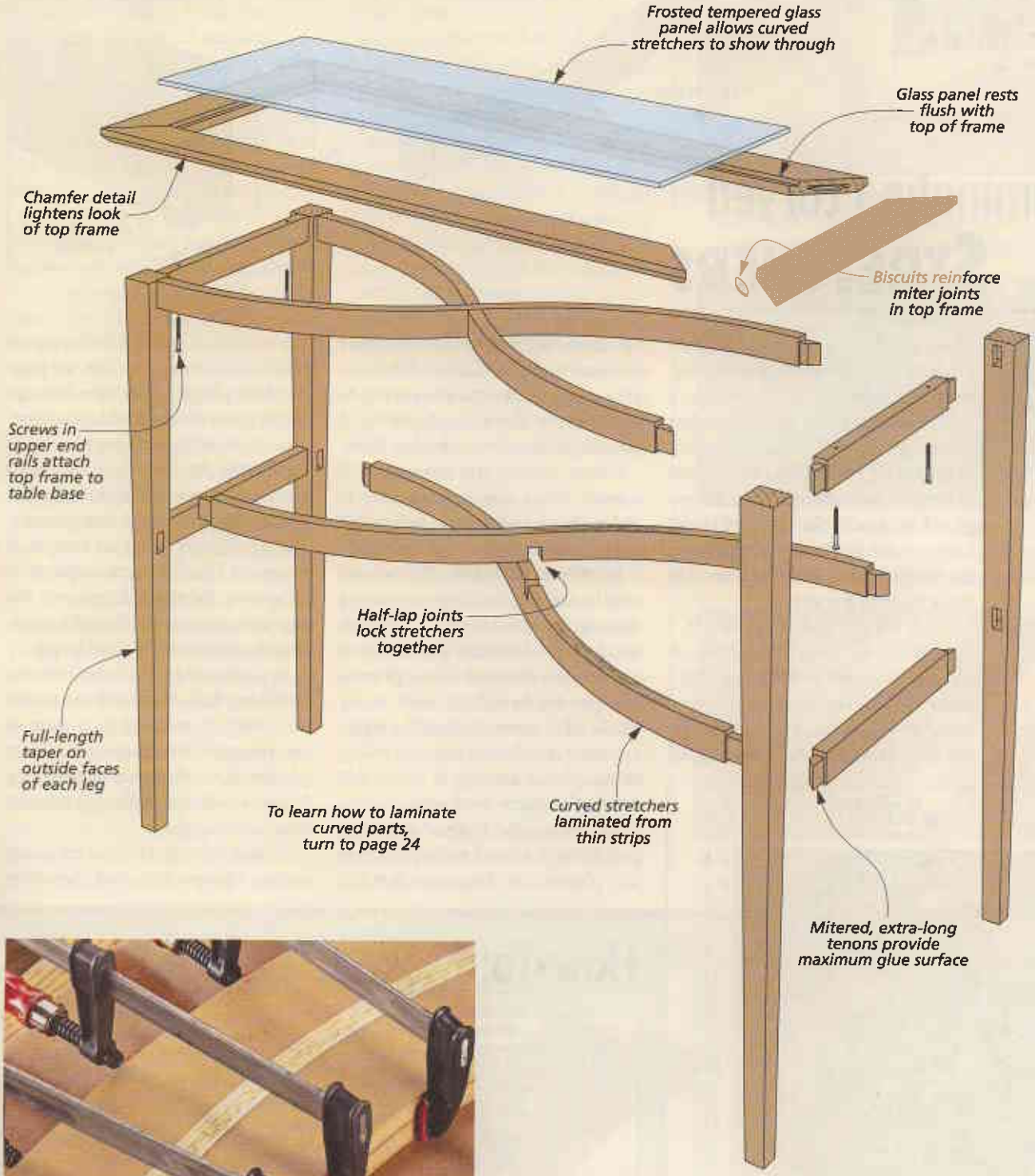
Most of the woodworking projects I build have parts that are straight, flat, and square. But every so often, it's nice to break out of the box and throw in a few curves. That's just what this accent table is all about — curved stretchers.

Getting pieces of solid wood to bend like this may seem impossible or at least complicated. But don't worry. It turns out to be a simple process that doesn't require any special tools or materials. The trick is that although they look like a single board, they're not. To get the wood to bend, each stretcher is cut down into thin, flexible strips. These strips are then coated with glue, wrapped around an S-shaped form, and clamped. The result is smoothly curved parts. With a little clean up, they're ready to use.

From then on, it's just a matter of some basic mortise and tenon and half-lap joinery. Along the way, you'll find some straightforward techniques for working with curved parts.

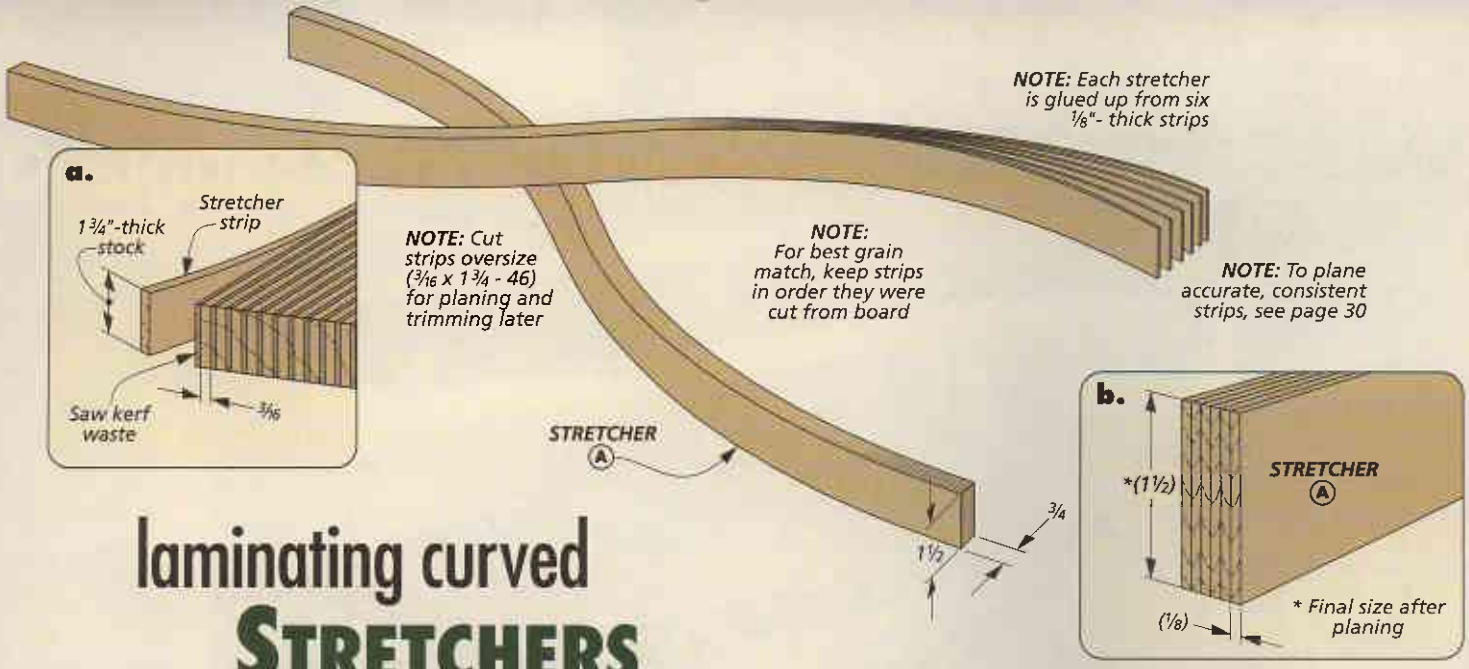
CONSTRUCTION DETAILS

OVERALL DIMENSIONS: 18"W x 38½"L x 31¾"H



To learn how to laminate curved parts, turn to page 24

◄ You'll find it's pretty easy to bend the curved stretchers for this accent table when you start with thin strips and use a clamping jig.



laminating curved STRETCHERS

Making the hour-glass-shaped stretchers is the most challenging part of building the table, so that's where I started. But you'll find that the process is pretty straightforward.

CUTTING THE STRIPS. Like I mentioned before, the four curved stretchers are glued up from thin strips of wood like you see in the drawing above. So, the first thing that you'll need to do is prepare the strips.

I did this in two steps. First, I ripped the 46"-long strips from an 1¾"-thick board on the table saw. I used the thicker stock to give me some wiggle room to clean up the stretchers after they have been glued up. I also cut the strips a little thicker than needed (3/16"), as in detail 'a.' This extra thickness allows me to plane away the saw marks for a smooth, nearly invisible glue joint.

When sawing the strips, you'll want to make sure to keep them in order. This way the grain will match once the stretchers are glued up.

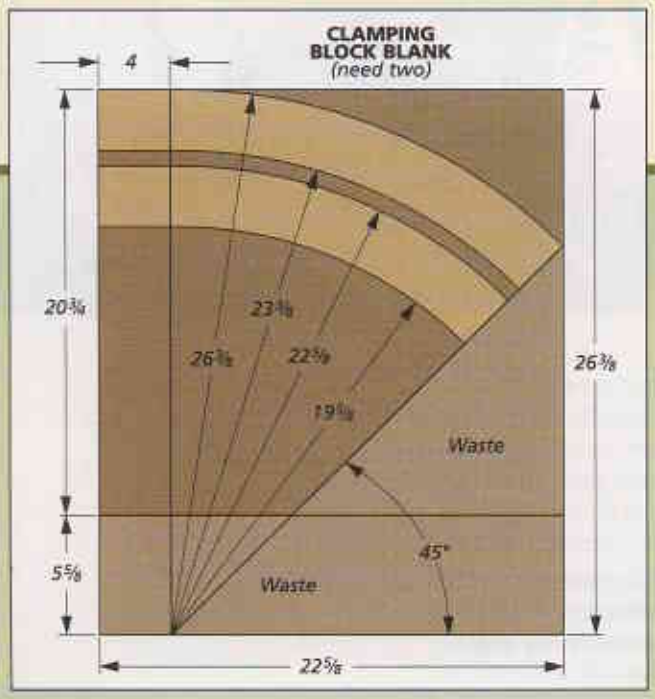
SMOOTHING THE STRIPS. The second step in making the strips is planing them to final thickness. Planing thin workpieces like this poses a few challenges. For one, some planers can't be set to reduce stock to ⅛" thick. And second, the thin strips can bend and flex on the feed rollers in the planer leading to strips that aren't a uniform thickness.

To get around both of the these problems, I added a simple auxiliary platform to the planer that acts as a smooth, raised bed for the pieces to ride on (For more on this, see page 30). After planing the strips, you can gather them (in order) into four bundles of six strips each for gluing.

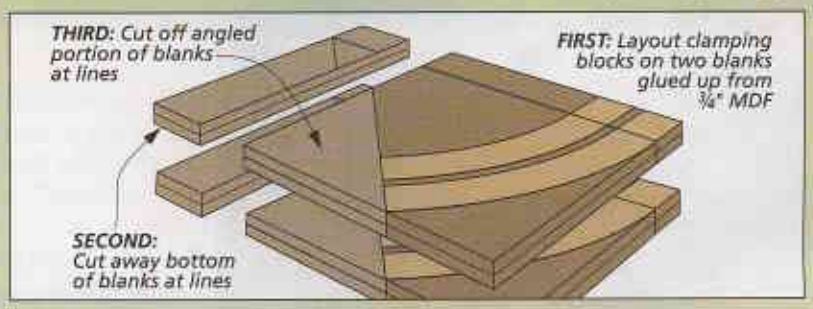
CLAMPING JIG. The next step is to bend the strips into shape. To do this, you'll need to make a clamping jig. The jig actually serves a couple of purposes. Besides the main purpose of holding the strips for gluing, the jig serves as a layout board for cutting the stretchers to final length.

You can see how it's built in the box along the bottom of these pages. Basically, it consists of a pair of clamping blocks attached to a large platform. Another pair of clamping blocks sandwich the strips into the final, curved shape.

To make the jig, I started by laying out two pairs of curved clamping



How-To: Make the Clamping Jig



Lay Out the Parts. *To lay out clamping blocks for the clamping jig start with two oversize MDF blanks, as shown in the drawing at left. Then trim off one end and the angled sides to locate the parts on the base.*

blocks. They're laid out on an extra-large blank made from two layers of ¾" MDF (lower left drawing on the opposite page). The outer clamping blocks at the end of the blank are then cut away and the curve on the inner, fixed clamping blocks can be sanded smooth.

Now, this remaining part of the blank is used to position the fixed clamping blocks on the jig base. Once you've marked the position of the blocks on the base, you can cut them free and glue them in place.

After you attach both fixed blocks to the base, there are just a few things left to do to complete the jig. One is to cut a notch on each side of the base to give you some knuckle room to tighten down the clamps.

Next, since it's nearly impossible to measure the length of curved parts, I marked the final length of the stretchers on each end of the jig. Then to keep the stretchers from getting glued to the jig, I just sprayed on a few coats of lacquer to all the surfaces that will be exposed to glue.

GLUING UP STRETCHERS. At this point, you're ready to start gluing up the stretcher blanks. Things can happen pretty quickly here, so it's a good idea to gather up all the supplies you need and do a dry run of the process to get the hang of it.

Probably the most important thing you'll need is clamps — and lots of them. More clamps will give you a smoother curve and gap-free joint lines. The next thing to think about is the glue. I used regular yellow wood glue to laminate the stretchers. And to quickly lay down a thin, even coat across the face of each strip, I used a plastic spreader.

Once glue has been applied to the strips, I place them in the jig. Then I grab a clamping block and clamp one side of the stretcher to the jig in the center of the curve. Now, clamp the other end of the stretcher the same way (top photo at right).

You don't need to lock the clamps down tight at this point. You just want to pin the stretcher in place. With this step done, it's just a matter of adding clamps until the strips are firmly in contact with the blocks.

WATCH THE ALIGNMENT. The glue can cause the strips to slide around. So once all the clamps are in place, I used a wood block and a mallet to tap them back into alignment (middle photo). When everything is lined up, I crank the clamps down tight and wait for the glue to dry.

In between glue ups, you can use a paint scraper to remove any leftover glue. And if necessary, apply more lacquer to places that have been scraped down to bare MDF. Then I repeat the glue-up process.

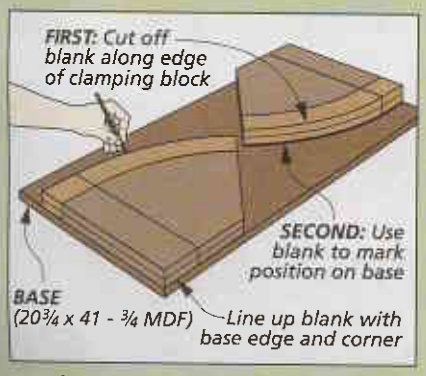
CLEANING UP. There are just a few steps left until the stretchers are complete. The first is to clean up one edge of each stretcher. The safest way to do this is with a belt sander. With this done, you can plane the stretchers to final width (1½"). The third step is to place the stretchers in the jig and mark each end. Then I cut them to length with a hand saw.

Shop Tips: Clamping Strips

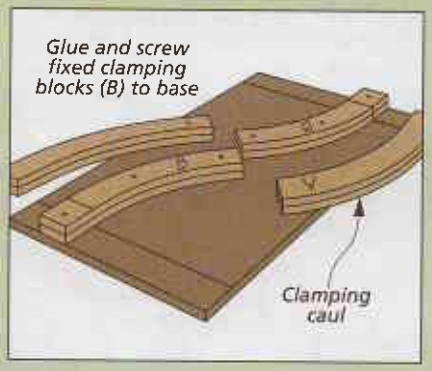
To start the clamping process, place the glued strips in the clamping jig. Then tighten one clamp on the midpoint of each curve. Now apply the rest of the clamps.

Grab a block of wood and a mallet to tap any strips that have slipped out of place flush with the rest. When they are all even, you can tighten down the clamps.

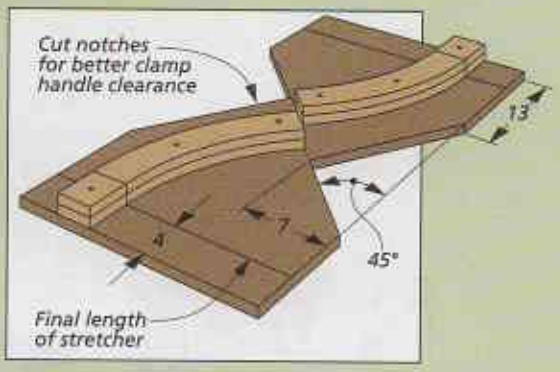
After the clamps are locked down, transfer the marks for the final length of the stretchers to the workpiece.



Mark Position. *After cutting away the outer blocks, set the blanks on the base, and mark they're position.*

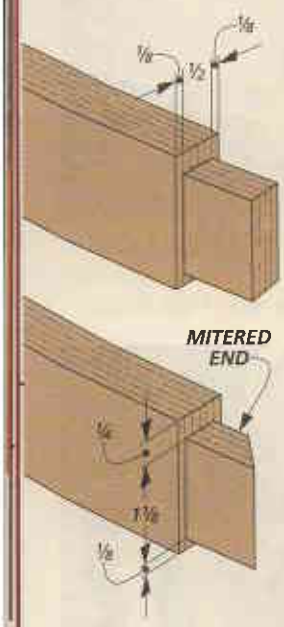


Attach Blocks. *Next, you can cut the fixed clamping blocks from the blanks and glue and screw them to the base.*



Cut Notches. *To provide more "knuckle" room when clamping, cut notches in each side of the base.*

cut the joinery on the STRETCHERS

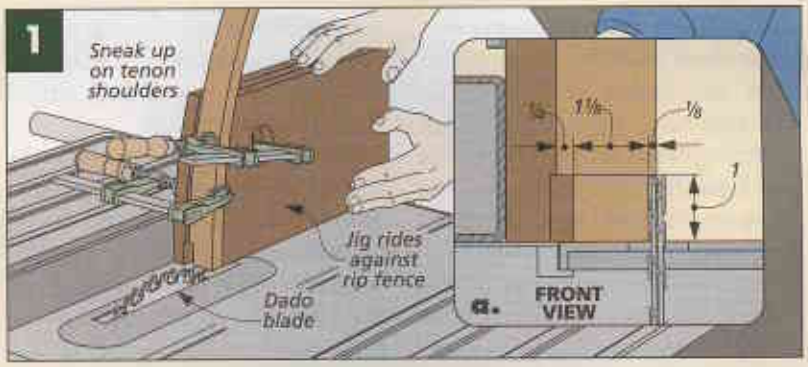


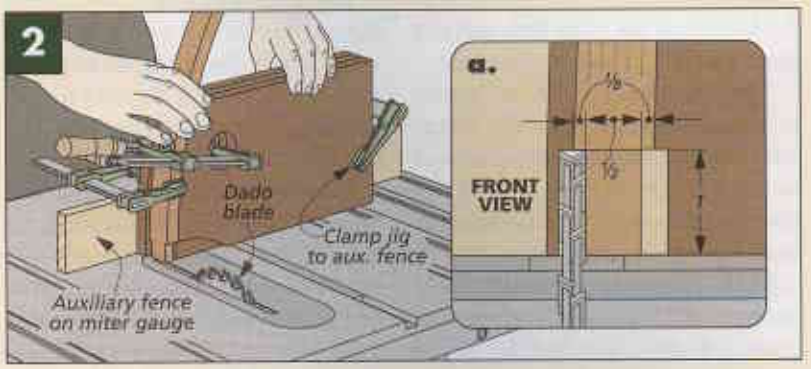
▲ Lay out the tenons on each end of the stretcher. Later, the mortises in the legs will be sized to match these tenons.

In spite of its contemporary looks, the joinery on this table is very traditional. I used mortise and tenon joints to connect the stretchers to the legs and a half-lap joint where the stretchers cross in the middle. What makes the joinery a little tricky are the curved stretchers. But don't worry, there are some simple steps that will remove a lot of the hassle.

TENONS. First up are the tenons on the ends of the stretchers. Now, I usually cut mortises first, then cut the tenons to fit later. But here, I did things a little differently. Since cutting tenons on curved stretchers can be tricky, I found it was easier to cut the tenons to exact size first. Then fit the mortises to the tenons later. However, if you want to be on the safe side, you could cut the tenons a little oversize and trim them to fit after cutting the mortises in the legs.

TENON JIG. The tricky part of cutting the tenons is holding the stretcher securely. To do this, I used a jig that matches the curve of the stretcher. The box below shows how it's built. Another unusual detail of this jig is that it's used to cut both the cheeks and end shoulders of the tenon. Here's how it works.





After laying out the tenons, you can clamp the stretcher in place to the jig, as in Fig. 1. (I laid out the tenon a bit oversize.) To cut the end shoulders, the jig rides along the rip fence. The idea here is to adjust the rip fence to nibble away at one side of the end shoulder until you reach the layout line. Then slide the fence over to cut the shoulder on the other side. Once you have the end shoulders cut on the stretchers, you can now cut the cheeks, one at a time.

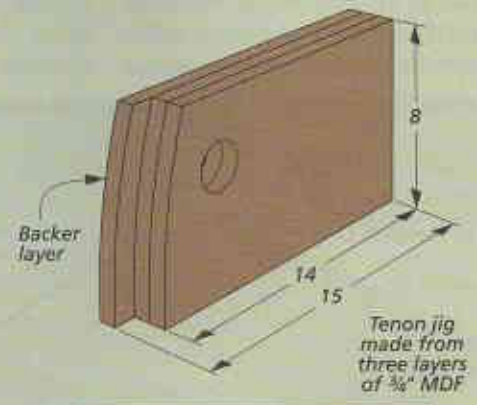
CUTTING THE CHEEKS. Although the process for cutting the cheeks is similar to cutting the shoulders, you'll need to change the orientation of the jig and workpiece. For this step, I clamped the jig to a long auxiliary fence on the miter gauge, as you can see in Fig. 2. Then it's just a matter of working up to the layout lines on each side of the tenon.

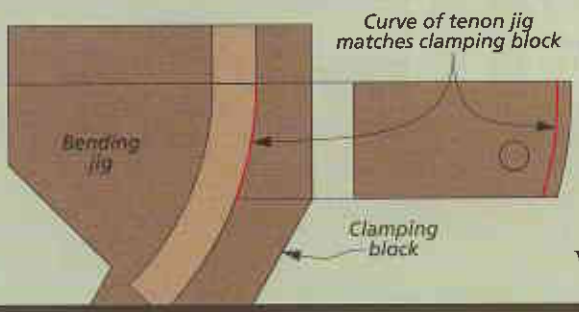
The last step in making the tenons is to miter the ends, as shown in the margin at left. The reason the tenons

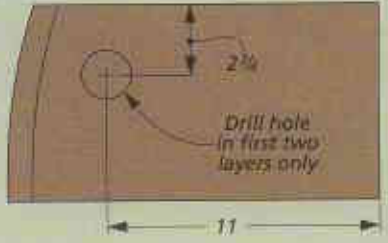
How-To: Building a Tenon Jig

There's nothing unusual about the tenons on the ends of the stretchers. The real challenge is finding a way to hold the curved pieces securely to cut the tenons.

To do this, I made a curved tenoning jig. It's designed to ride along the rip fence for cutting the tenon shoulders. Then it can be clamped to the miter gauge for cutting the tenon cheeks. The jig is made up of three layers of MDF. The curve on the jig matches the curve of the stretchers to cradle it. I also drilled a hole in the support layers to allow me to clamp the stretcher to the jig. The backer layer keeps the workpiece from tipping.







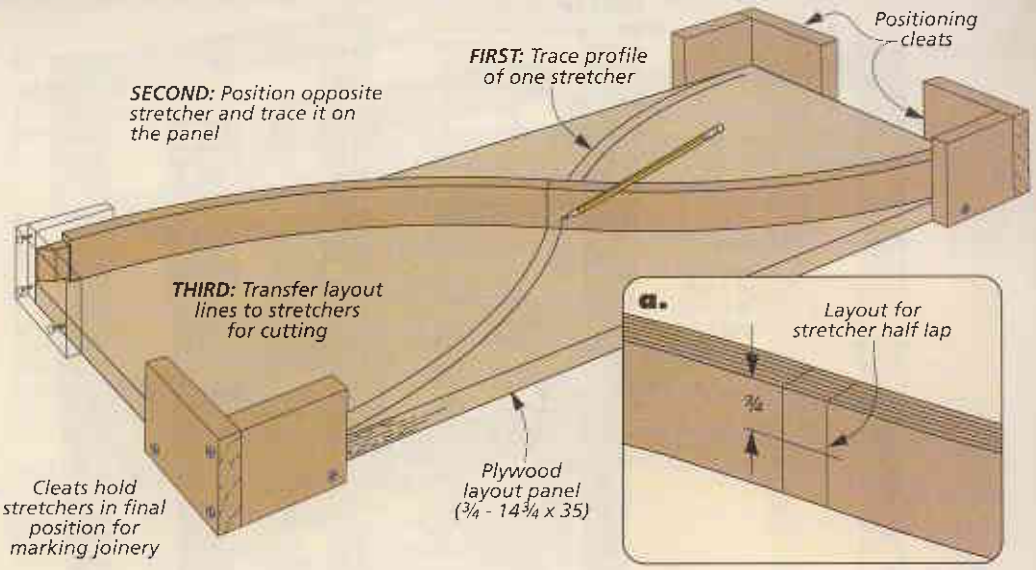
are mitered is strength. The longer the tenon, the stronger the joint. However, the long tenons on the stretchers and end rails that are made later will run into each other. The miter simply allows the tenons to fit in the mortise together.

HALF LAP

With the tenons in good shape, you can move on to cutting the half-lap joint that connects each pair of curved stretchers. Cutting the joint isn't all that difficult. The challenge is in laying it out. Besides looking for a tight-fitting joint, you need to make sure the distance between the tenoned ends is identical.

LAYOUT PANEL. The solution I used is the plywood layout tray shown in the drawing at right. It's sized to match the crossed pair of stretchers. A set of blocks on each corner holds the stretchers in place. Because the stretchers spring back slightly when they come out of the clamping jig, you may need to flex them a bit to get them in the layout tray.

To mark the joinery, I set one stretcher in place in the tray and traced its outline. After doing the same for an opposing stretcher, you have a perfect guide to where the half-lap joint needs to be. Now, you can lay each stretcher in position on the panel and transfer the location of the joint to the workpiece.



CUTTING THE HALF LAP. Cutting a half-lap joint in the middle of a curved workpiece would be troublesome on a table saw. So instead, I got out my hand saw and a few chisels to do the job. You can see the steps I took in the box below.

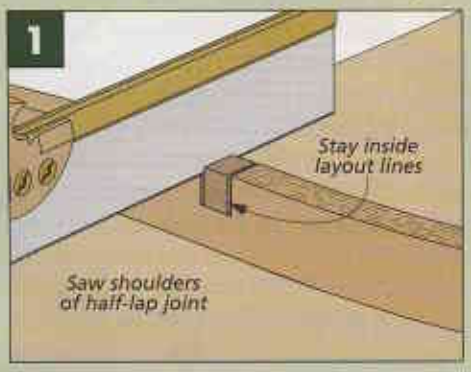
The first step is to use the hand saw to cut the sides of the joint. I stayed just to the inside of the layout lines so that I would have some material left for final fitting. The waste between the kerfs is then cleaned out with a chisel.

Once it's roughed out, you can begin fine-tuning the fit. The goal of the fitting is to have the distance between the tenons on each end be the same. So with a chisel, and some sandpaper, you can tweak the fit of the half lap until the two halves slide together snugly. You'll want to take your time here and test the fit of the joint often. Just don't glue it up yet.

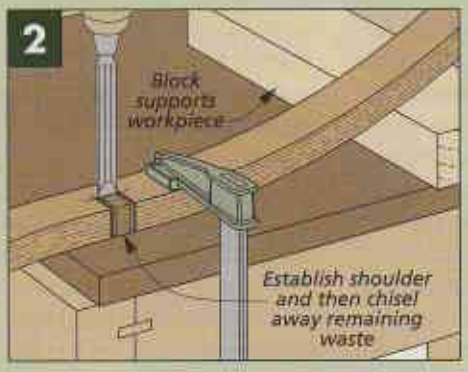
That just about wraps up the work on the stretchers. There's still some fitting on the tenons that you'll need to do, but for now, you can set aside the stretchers and start on making the rest of the table base parts.

◄ The goal when fitting the half-lap joint is a snug, slip fit that doesn't have any gaps. Test the fit of the joint often for the best results.

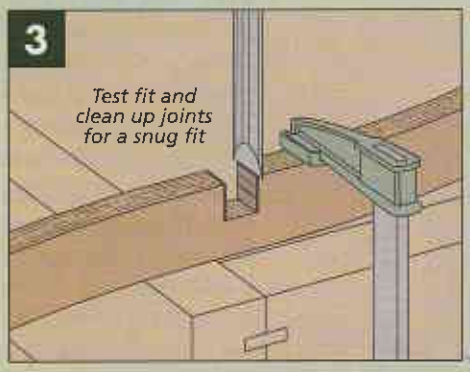
Hand-Fit a Half Lap



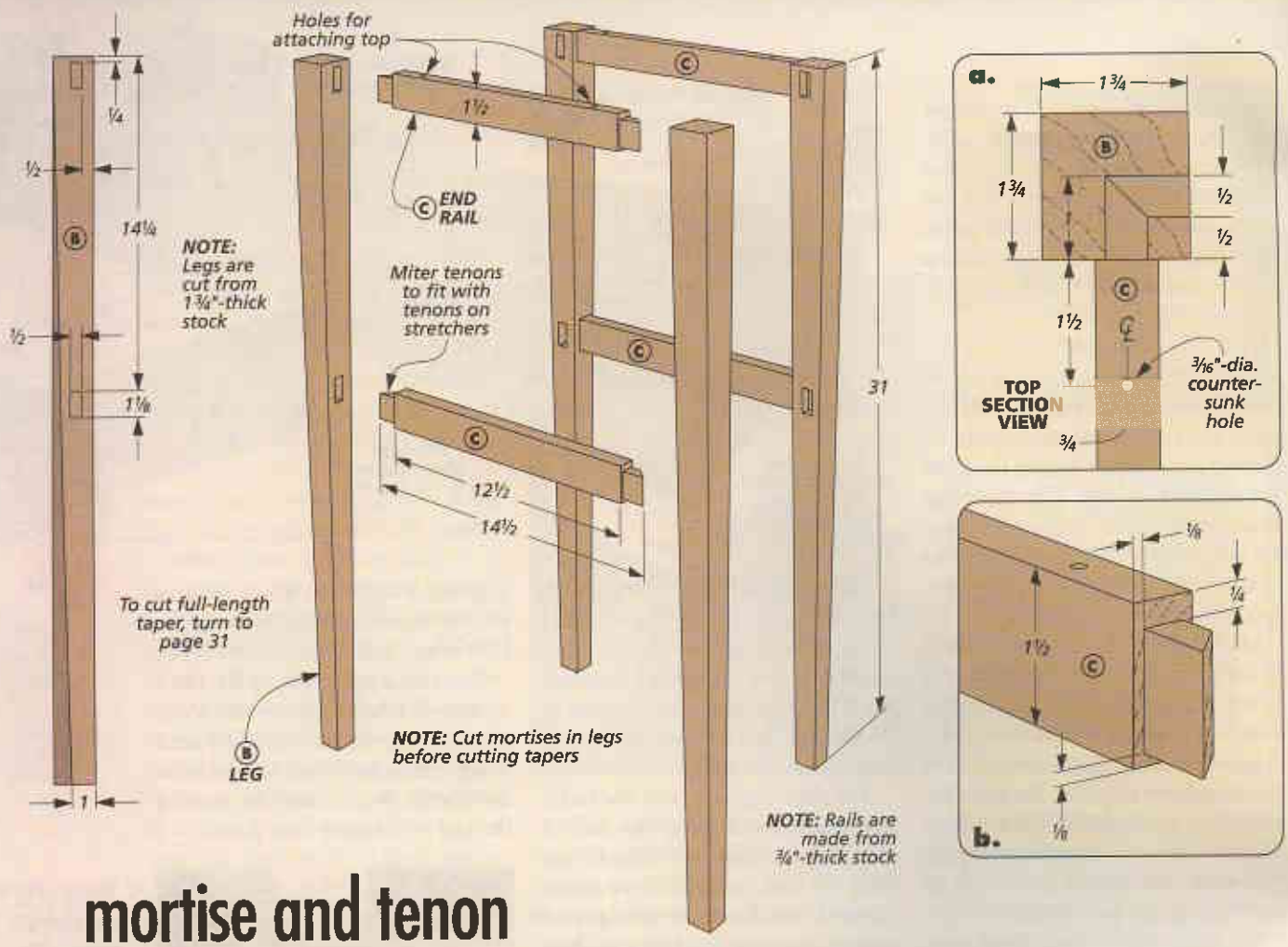
Cut the Shoulders. *After marking the position of the joint, use a hand saw to cut the shoulders of the half lap. Stay to the waste side of the lines and concentrate on keep the saw square to the workpiece.*



Chisel to the Baseline. *With the shoulders cut, the next step is to remove the waste. I picked up a wide chisel for this task. Again stay to the waste side of the line to leave room for the final fitting.*



Fine-Tune the Joint. *The final step is to trim the sides of the joint for a snug fit. Take it slow here and check the fit often. I used a chisel, file, and some sandpaper to get the tightest, gap-free fit possible.*



mortise and tenon
End Assemblies & the Top

Now that you have the stretchers pretty much finished, the rest of the table is pretty straightforward stuff — literally. All that remains are the two end assemblies and a top frame that holds the glass panel.

END ASSEMBLIES. Each end assembly consists of two legs and a pair of end rails. And like the joinery on the stretchers, the end assemblies feature mortise and tenon joinery to connect the rails and tapered legs, as illustrated in the drawing above.

The first parts to make are the legs. And there's nothing too complicated here, you just want to make sure and do things in the right order.

MORTISES FIRST. After cutting the 1¾"-square leg blanks to length, the next step is to make the mortises for both the stretchers and end rails, as in the left margin above. Just be sure to size the mortises for the stretchers to match the tenons on the stretchers you cut earlier. I've found it's much easier to cut accurate mortises while the piece is still square. So I did this before moving on to cut the tapers.

When cutting the mortises, you'll notice that they intersect in the corners, as you can see in detail 'a' above. I like to "rough out" the mortises on the drill press. Then I can clean up the edges and square up the ends with a chisel.

TAPERS NEXT. The only other detail on the legs is a full-length taper on the outside faces of each leg, as shown in the left margin above. To cut the tapers, I put together a simple jig. It's basically a plywood sled with some scrapwood fences added to capture the legs on the sled. I laid out the taper on one leg blank to use as a set-up gauge for the fences on the jig. You can read more about it on page 31. Once the jig is ready, cutting the tapers goes pretty quickly.

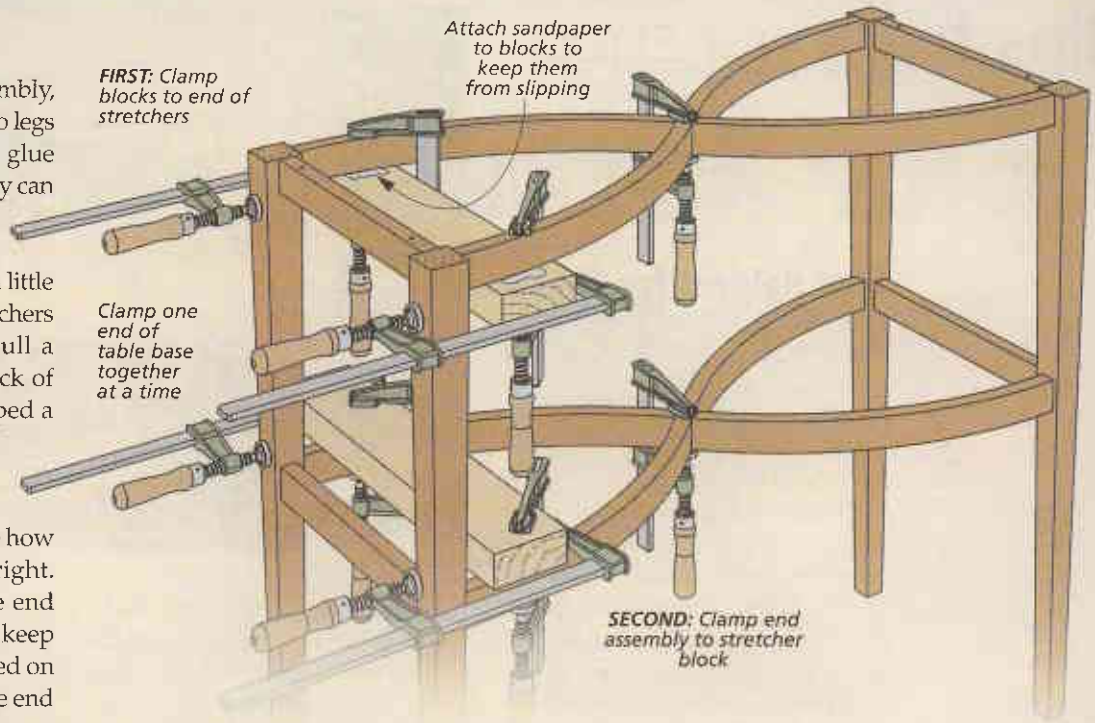
MAKING THE END RAILS. The end rails are even simpler to make than the legs. Just use the dimensions given in the drawing as a guide to cut the rails to size. The next thing to do is to drill some countersunk shank holes in the upper rails, as shown in detail 'a.' These holes will be used to attach the top frame that's built later.

TENONS. There are only a couple things left to do on the rails. One is to cut a tenon on each end. But after cutting the tenons on the curved stretchers, making these is a piece of cake. The other thing you'll need to do is miter the tenons to match the miters on the stretchers you made earlier. It's a good time to grab the stretchers and fine-tune *either* the tenons or the mortises for a snug fit.

ASSEMBLE THE TABLE BASE. At this point, the base of the table can be assembled. I broke up the assembly process into a couple stages to make things less hectic. It's also a good idea to use slow-setting glue to give you some extra time.

For the first stage of the assembly, I glued up each end section (two legs and two rails). Then, after the glue dried on these two sections, they can be connected to each other by attaching the stretchers.

This is where things can get a little tricky. Because the crossed stretchers are flexible, you can't just pull a clamp across the front and back of the table base. Instead, I clamped a block near the end of each stretcher and then pulled the tenons into the mortises with clamps at each leg. You can see how I did this in the drawing at right. Here again, I clamped up one end of the table, then the other. To keep the blocks from slipping, I glued on a few strips of sandpaper to the end of each clamping block.



This is also the time to glue up the half-lap joint on the stretchers. I simply wiped on some glue and pulled the joint closed with a clamp.

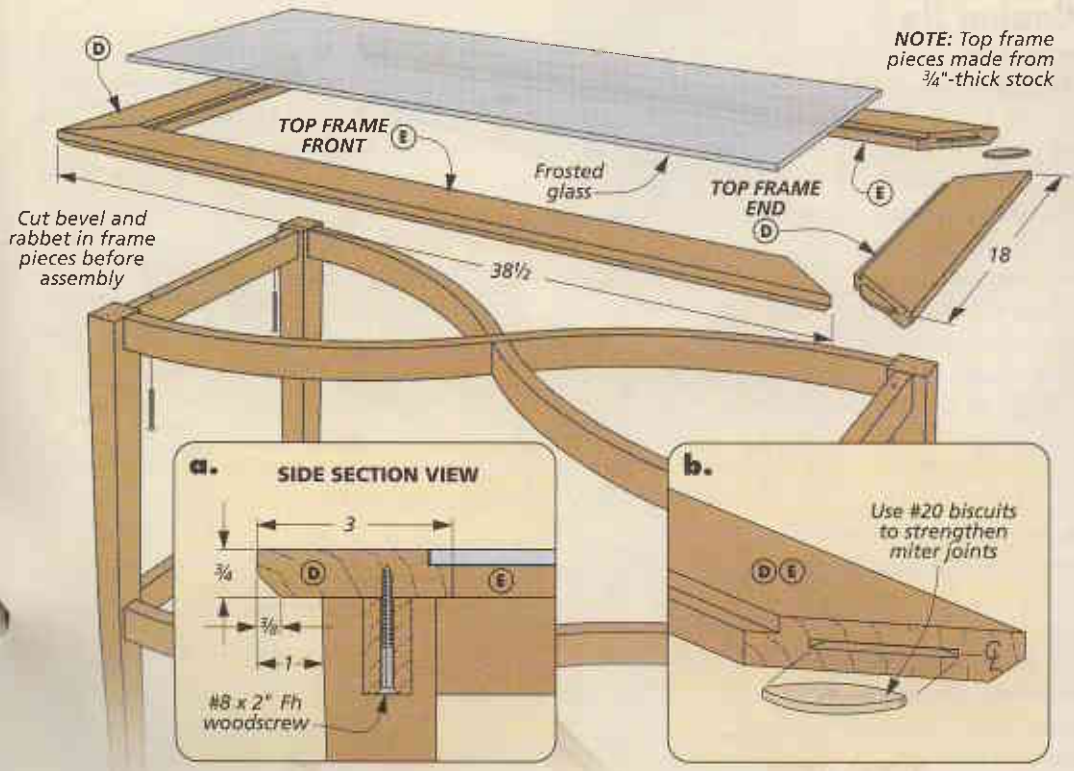
TOP FRAME

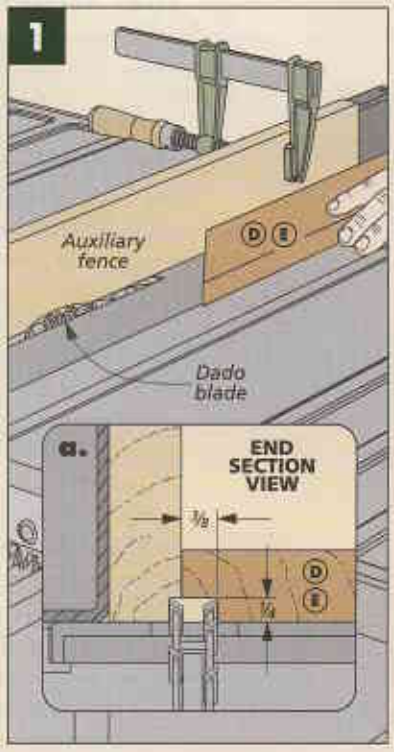
The final section of the table to build is the top frame that wraps around the glass panel and covers the tops of the legs, as shown in the drawing below. With the table base complete, it's a good idea to double check the measurements of the base before sizing the top frame parts. After ripping the frame pieces to width there are a few details to add. The first is to rout a slight chamfer on the bottom edge of the parts. This gives the top frame a lighter look.

The next step is to cut a rabbet in the top inside edge of the frame parts (Figs. 1 and 1a). This is where the glass panel will rest. Finally, the pieces can be mitered to length.

Now, a miter joint doesn't offer a real good gluing surface, so I like to reinforce it. For this frame, I picked up my plate joiner and used biscuits, as you can see in detail 'b.'

Once the frame has been assembled, you can attach it to the table with screws. After applying a few coats of finish, you can set the glass panel in place (I used frosted, tempered glass) and show off your skills at "bending" wood. W





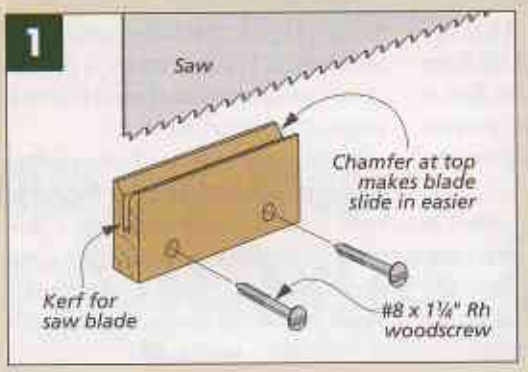
SHOP NOTEBOOK

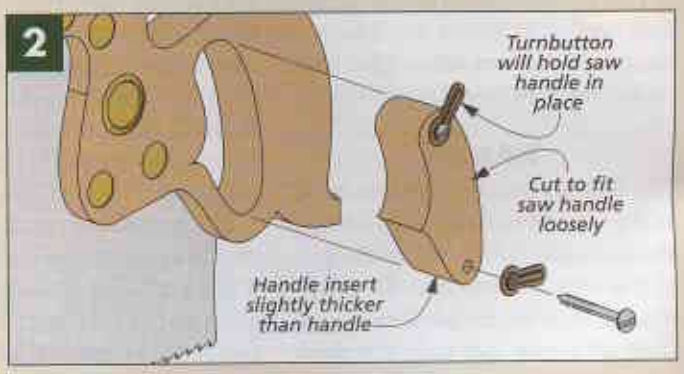
Saw Holders for Chest

To make the best use of the storage available in the tool chest on page 32, I went to the top — actually the lid. There was enough room here to attach a couple of hand saws, like you see in the right photo.

The first thing I did was to make a blade support (Fig. 1). Just don't make the kerf too deep, or it'll interfere with the mounting screws. A chamfer along the top edges allows the blade to slide in easier.

Next, I traced the inside shape of the saw handle onto paper to make the handle insert. The insert was cut 1/16" smaller than the handle so the handle would slide over the insert easily. The insert also needs to be a hair thicker than the handle so the turnbuttons will work easily (Fig. 2). The screws attaching the turnbuttons to the insert should be long enough to extend into the lid about 1/2" to hold the insert in place as well.



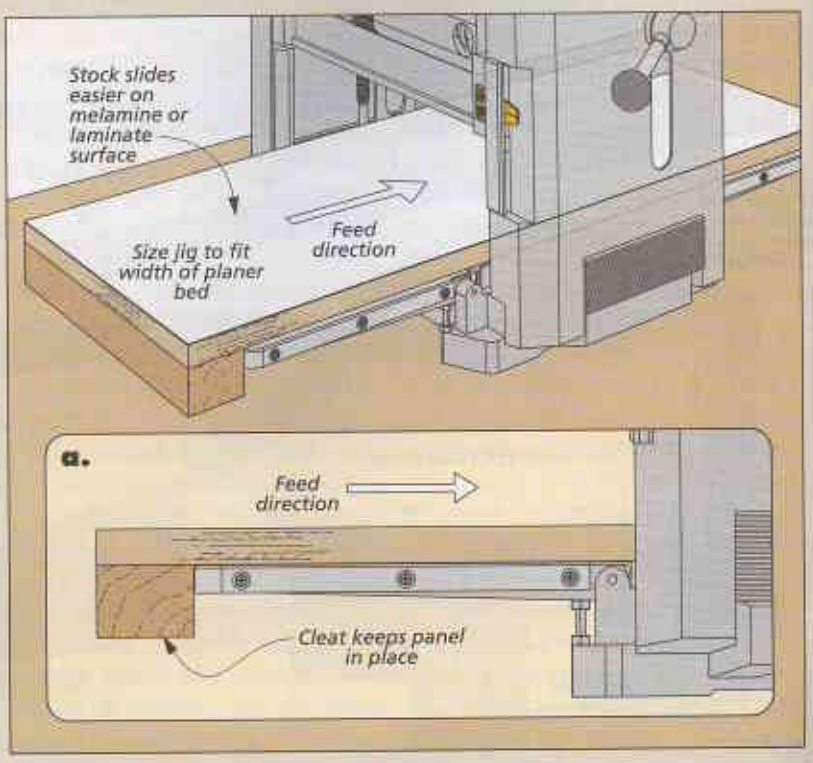


Thin Strip Planing Jig

The marquetry box on page 16 and the accent table on page 22 require several pieces of thin stock. The problem is some planers won't allow you to plane stock down to the 1/8" thickness needed. To solve this problem, you can "raise" the bed of your planer with the simple jig you see in the drawing at right.

The jig is just a 3/4" plywood base sized to match the width of the planer's bed. An optional layer of plastic laminate allows the workpiece to slide smoothly through the planer. The base is cut extra-long to allow for a cleat at one end. The cleat overhangs the end of the infeed table to prevent the jig from being pulled through the planer (detail 'a').

Planing the thin strips is just a matter of feeding them into the planer with the grain, taking very shallow cuts until you reach final thickness.



Full-Length Taper Jig for Legs

The accent table on page 22 has tapered legs. With eight tapers to cut, I decided to build a jig to cut them on my table saw.

First, I laid out the taper on one of the leg blanks. The tapers will be cut along the two outside faces of each leg. So I marked the waste area on one end of the blank.

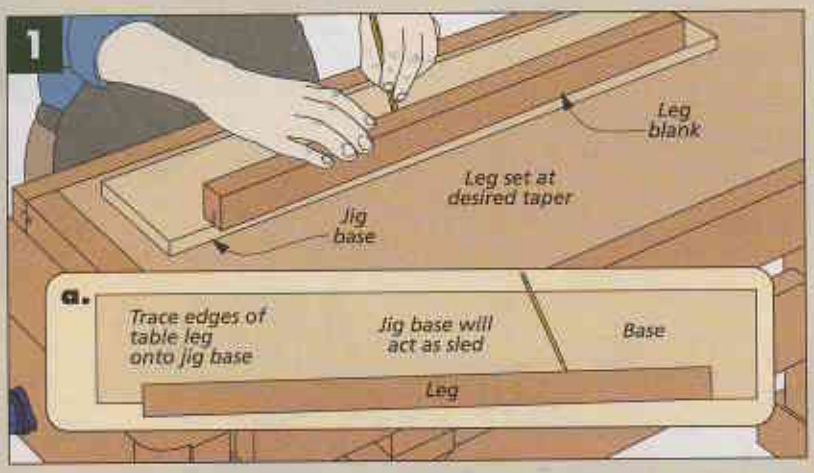
Then, I turned to making the jig. It's simply a couple of cleats attached to a plywood base.

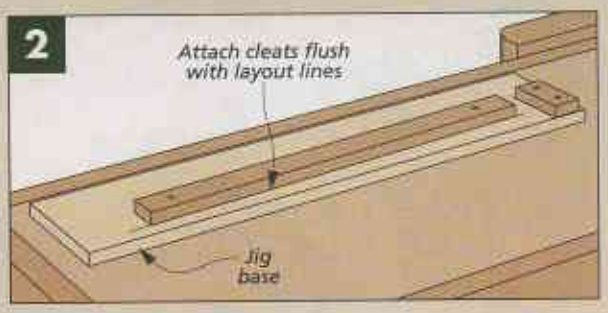
To determine where to place the cleats, lay the blank you marked earlier onto the jig base (Fig. 1). Place the outside edge of the top end of the blank even with the edge of the jig base. Line up the bottom end that has the pencil mark with the edge of the base as well.

Next, trace the profile of the blank onto the base (Fig. 1a). Then, remove the blank and attach the cleats flush with the pencil lines (Fig. 2).

To use the jig, begin by setting the rip fence a little wider than the jig and cut a taper. You should be a little outside of your line. Adjust the fence to sneak up on the line. When the first taper looks right, go ahead and cut the others.

Hint: Carpet tape will help hold the blank on the jig while cutting.





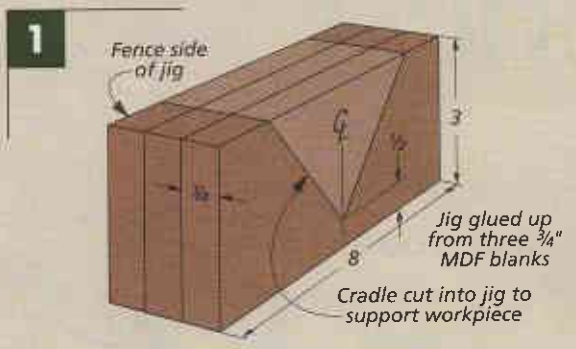
Mitered Spline Jig

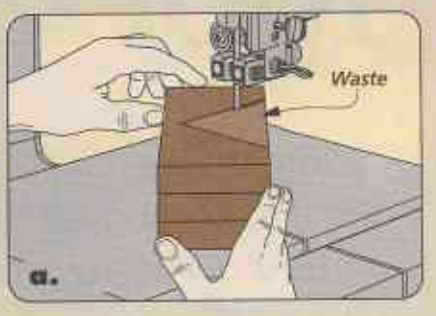
The jig used to cut the corner splines for the marquetry box on page 18 is really fairly simple to make. I made it by gluing up three pieces of ¾" MDF and cutting the block to size on my table saw (Fig. 1).

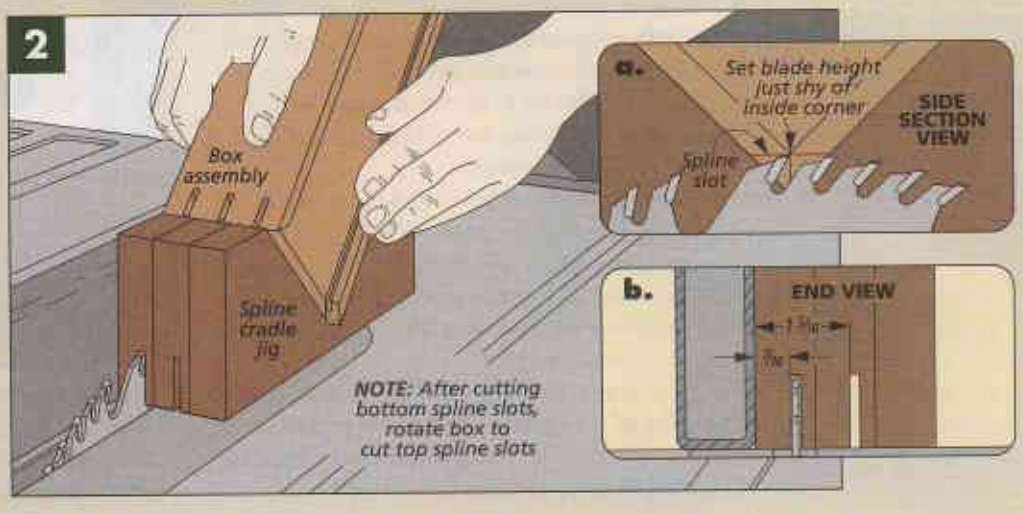
To cut the notch, first find the centerline. Mark that point at ½" from the bottom of the block. From that point, use a combination square to draw lines to get a 90° angle. Then, cut the waste with a band saw (Fig. 1a). Next, sand the notch smooth, so the box will sit square in it.

To cut the slots, seat a corner of the box firmly into the notch (Fig. 2). Then you can set the blade and fence (Figs. 2a and 2b). After you make the cut, just flip the box over until all the bottom slots are cut. Next, rotate the box and cut the slots along the top.

When you're finished with that, readjust the rip fence to position the jig for the center slots. Then, cut them out the same way. W







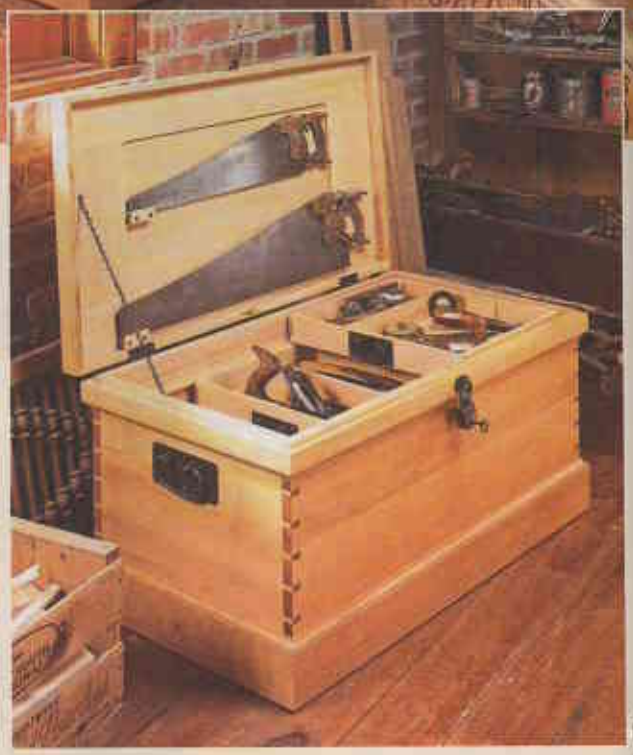
traditional Tool Chest

More than just a place to store your tools, this traditional chest also gives you a chance to show off your skills as a woodworker.

There's something about an old tool chest that's hard to describe. Whenever I come across one, I can't resist the temptation to open the lid to see what might be inside. And for a long time, I've wanted to build a chest like so many of the ones that I've seen.

But how do you build an "old" tool chest? Well, we did it by using some of the same details you would find in an antique chest — solid wood construction, a frame and panel lid, and heavy iron hardware. There's even an old-fashioned hasp and lock to keep everything inside safe and secure.

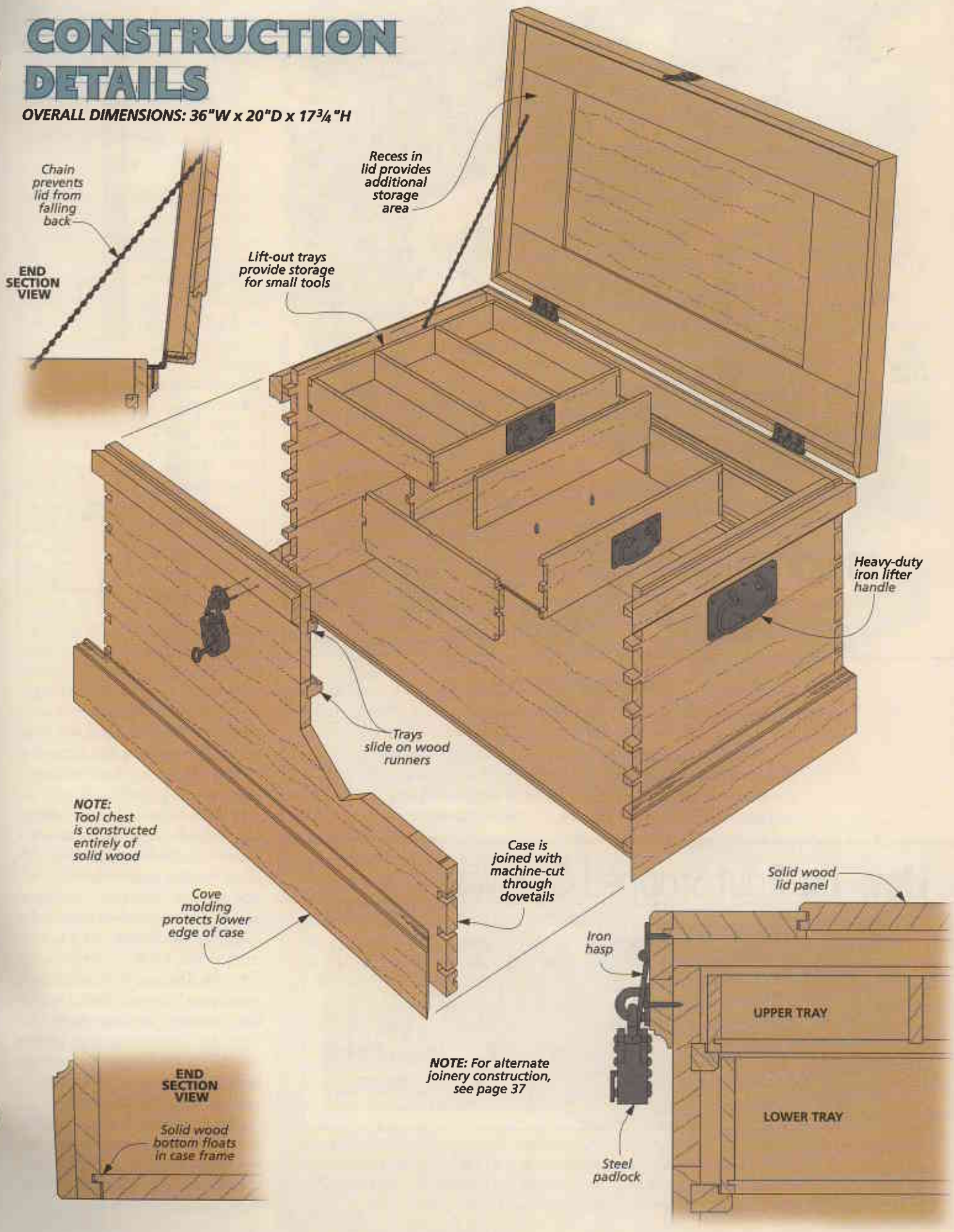
This tool chest also features through dovetail joints. But many old tool chests were built using rabbet joints and nails. So we've included instructions on building the chest using simpler construction as well.



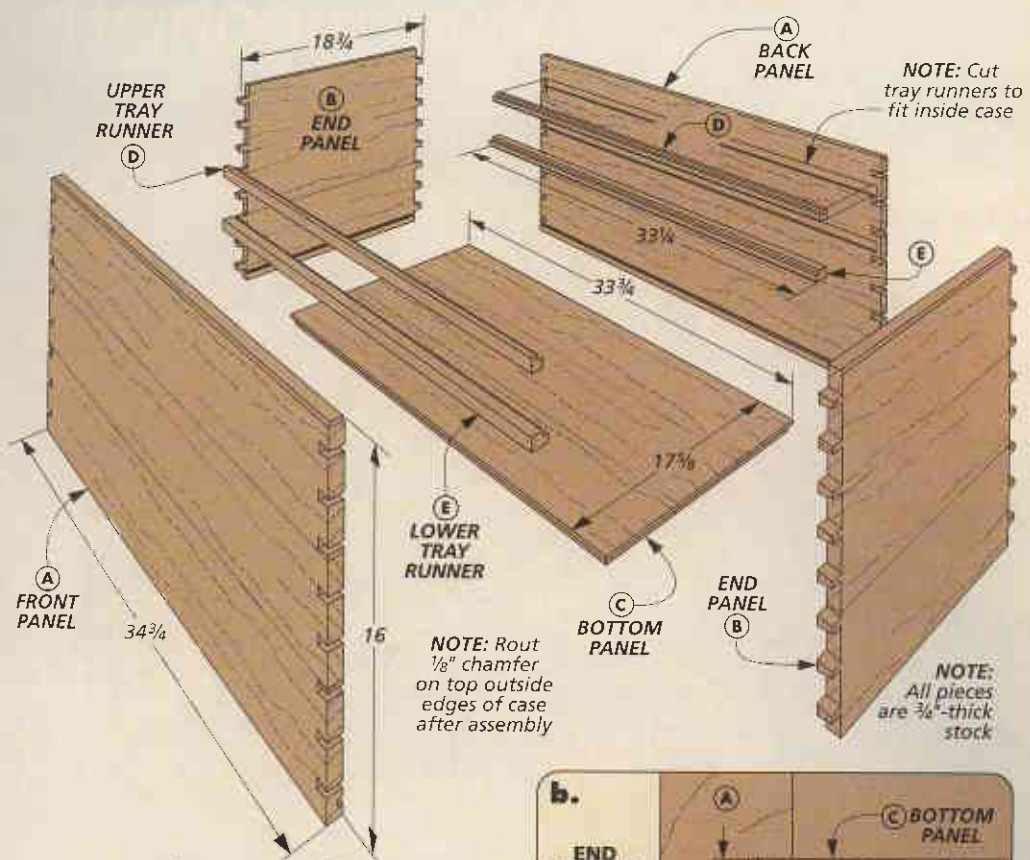
▲ Inside the tool chest, a pair of sliding trays provides storage for fine tools or smaller items that might possibly get buried if kept in the main section of the chest. The lid offers space for storing a couple of hand saws.

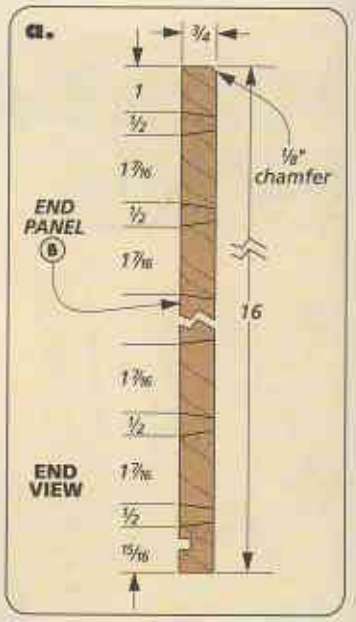
CONSTRUCTION DETAILS

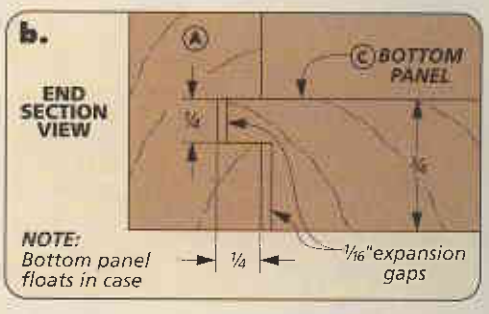
OVERALL DIMENSIONS: 36"W x 20"D x 17¾"H

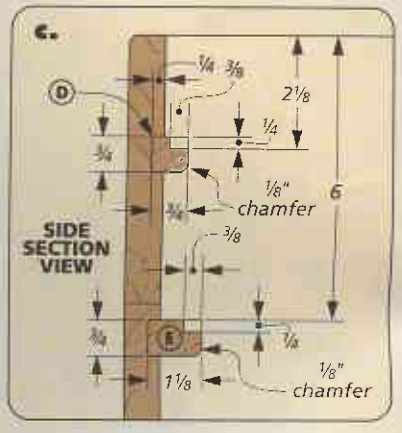


NOTE: For alternate joinery construction, see page 37









making the CASE

This tool chest can be broken down into two sections — the case and the lid. I began with the case. The first step here is to glue up blanks for the case front, back, and ends. But before you can cut these to finished length, you need to decide on the joinery.

If you take a look at the drawing above, you'll see that I built my tool chest using dovetail joints, both for their strength and appearance. Take a look at detail 'a' and the opposite page for more on making these dovetails.

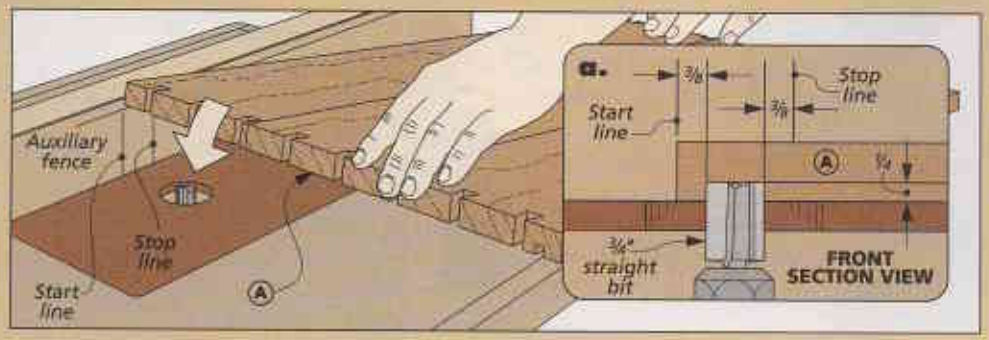
If you don't have a dovetail jig, rabbet joints and nails are a good alternative for building the case. For more on making this version of the tool chest, see the Designer's Notebook on page 37.

GROOVES. With the case joinery complete, the next step is to cut a groove on the inside face of each piece for the case bottom. You'll also need to cut a pair of stopped grooves on the inside face of the case front and back for the tray runners (see the box at left).

BOTTOM. The case bottom is a solid wood panel that is rabbeted to fit in the grooves in the case pieces. One thing to note here is that I left a slight (1/16") expansion gap along both edges of the bottom panel, as you can see in detail 'b.'

RUNNERS. After gluing up the case and routing a chamfer around the top edge, you can make the tray runners and glue them in place, as shown in detail 'c' above.

How-To: Rout Stopped Grooves



Stopped Grooves. *To make the stopped grooves for the tray runners, I first set up the fence on my router table to position each groove. Then I drew a couple of lines on the fence to indicate the starting and stopping points of the cut. Finally, I routed each groove by lowering the workpiece down onto the rotating bit and pushing it forward.*

How-To:

Machine-Cut Dovetails

Although you could cut the through dovetails on the tool chest by hand, I chose to use a dovetail jig for a couple of reasons — speed and consistency. Cutting all those dovetails by hand would have taken a lot of time. And because the joints are the focal point of the whole tool chest, I wanted them to be as accurate and precise as possible. That's where the router and dovetail jig comes in.

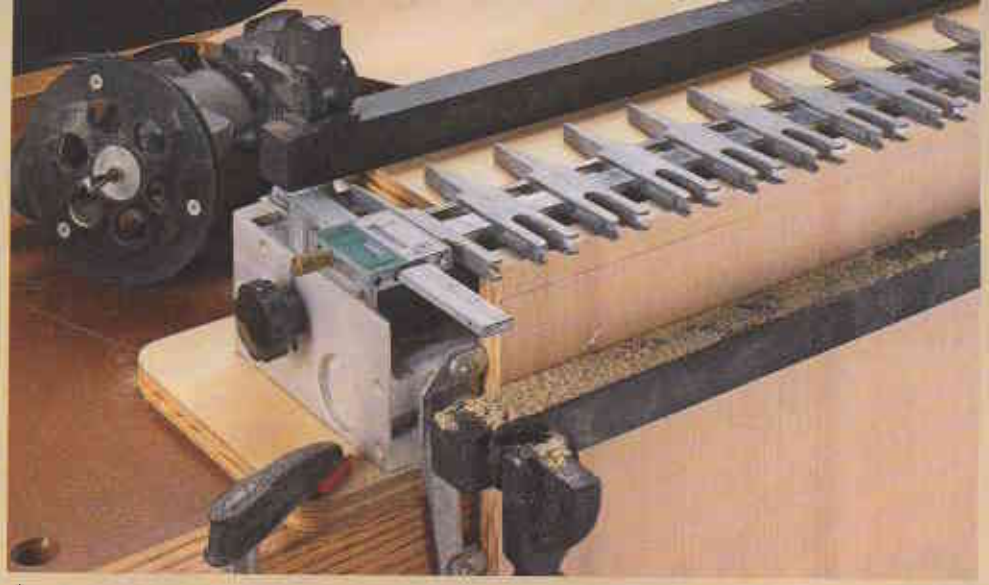
Although they may look complicated, the idea behind most dovetail jigs is pretty simple. In a nutshell, a bushing is used to guide the bit in and out of the fingers of a template, removing the waste in between the tails and pins of the joint. One edge of the template is used to rout the tails, and the other is used to rout the pins.

To rout the dovetails for the tool chest, you'll need a jig that is capable of cutting through dovetails with variable spacing in a workpiece that is 16" wide. I used a *Leigh D4* dovetail jig, but there are several other jigs on the market that will do the job. Just make sure to read the directions that come with your jig before getting started.

SPACING. Before you can actually start routing the dovetails, you'll need to adjust the spacing of your template to match the desired spacing of the joints. (Detail 'a' on the opposite page shows the spacing of the pins.)

With the *Leigh* jig, this is simply a matter of loosening a screw that holds each finger in place and then sliding the fingers into position.

Once you've got the fingers in position, you can start routing the dovetails, as shown in the photos at right. I routed the tails first, then the pins. For more on fitting and assembling through dovetails, see the article on page 50.



Start with the Tails. *After setting the spacing of the fingers, you're ready to rout the tails on the ends of the front and back panels of the tool chest. A baseline drawn on the face of the board will help you set the depth of the router bit.*

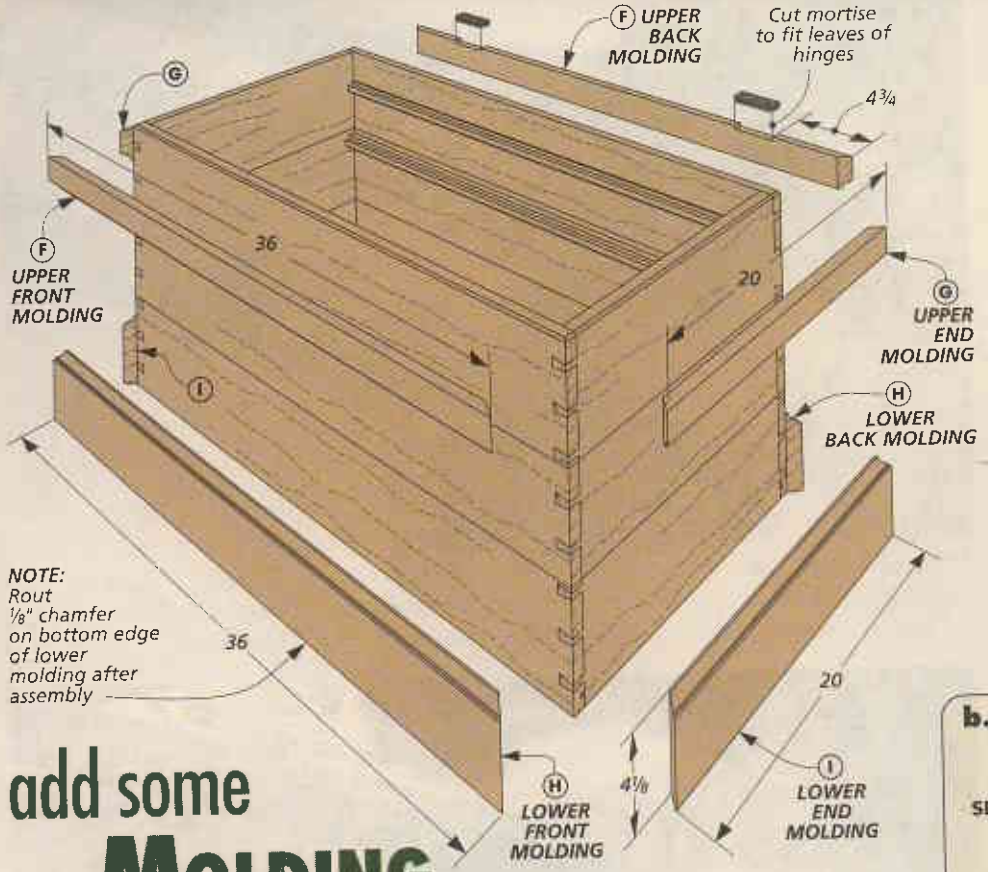
Rout the Pins to Fit. *With the tails completed, the next step is to rout the pins on the end panels. You'll start by making the pins a hair wide. Then you can adjust the jig to gradually trim the pins down to match the tails for a perfect-fitting joint.*

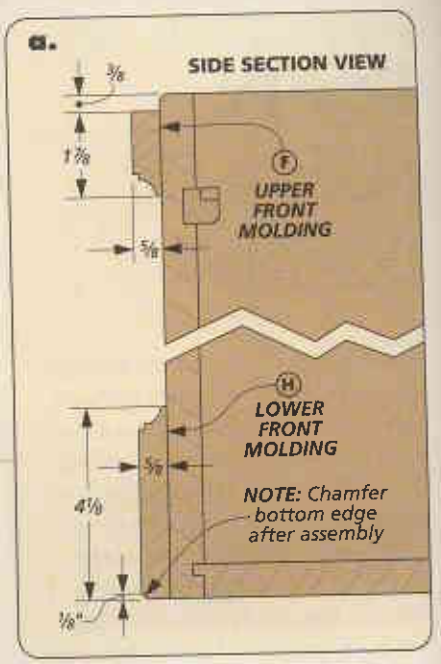
Router Bits

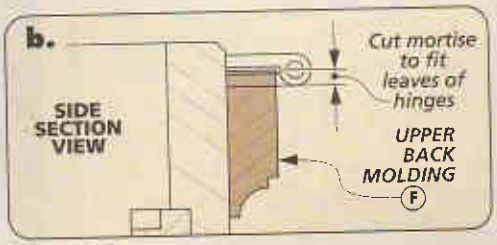
An important part of any dovetail jig is having the right router bits. For most jigs, you'll need two different router bits. To rout the tails, a dovetail bit is used (right bit in photo). The angle of the bit matches the angle of the dovetails you plan to make. (For the tool chest, I used a bit with an 8° angle.)

To rout the pins, all you need is a straight bit (left bit in photo). This bit simply wastes away the material in between the pins. The tapered fingers of the jig are what determines the shape of the pins.

It's worth noting that many jigs (including the *Leigh*) are designed to work only with specific bits.







add some MOLDING

Once you've assembled the case, all that's left before moving on to the lid is to add some molding to the top and bottom of the case.

If you take a look at the drawing above, you'll see that I used the same profile on both the upper and lower molding — a cove with a small shoulder. The only difference is in the width of the pieces. (For more on making the molding, take a look at the box below.)

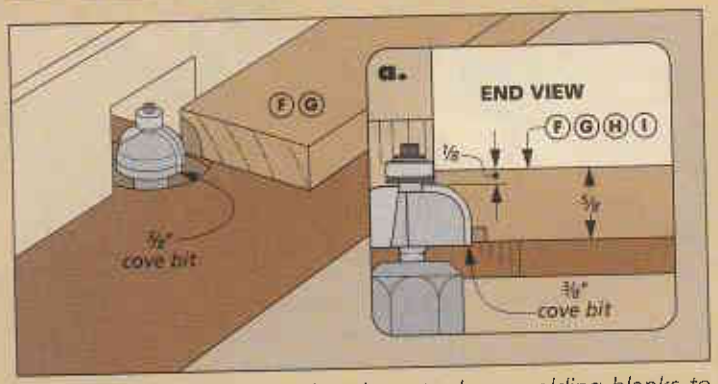
The molding is simply mitered to length to fit around the case. The lower molding pieces can be glued in place so they're flush with the bottom edge of the case, as you can see in detail 'a' above. But attaching the upper molding involves a couple of extra steps.

OTHER DETAILS. To begin with, you'll need to cut a pair of mortises in the upper back molding piece for the lid hinges (detail 'b').

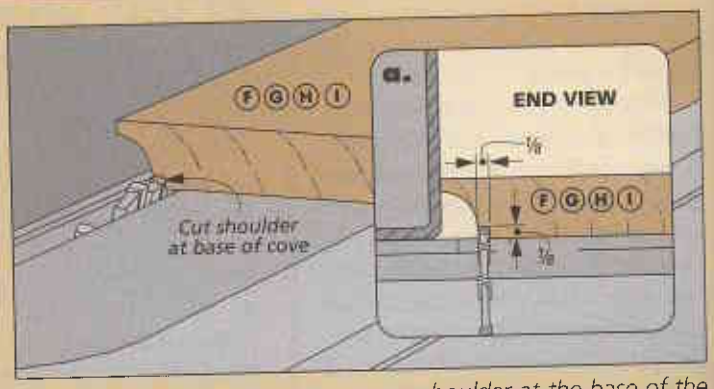
Next, if you take a look at detail 'a' above, you'll notice that the upper molding is installed below the top edge of the case. This creates a lip for the lid to fit around. To help position these pieces, I simply scribed a line all around the case, ⅜" down from the top edge.

The last step before moving on to the lid is to rout a chamfer all around the bottom of the case, as shown in detail 'a.'

How-To: Cove Molding



Rout the Cove. *After cutting the extra-long molding blanks to width, I routed a cove along one edge of each piece.*

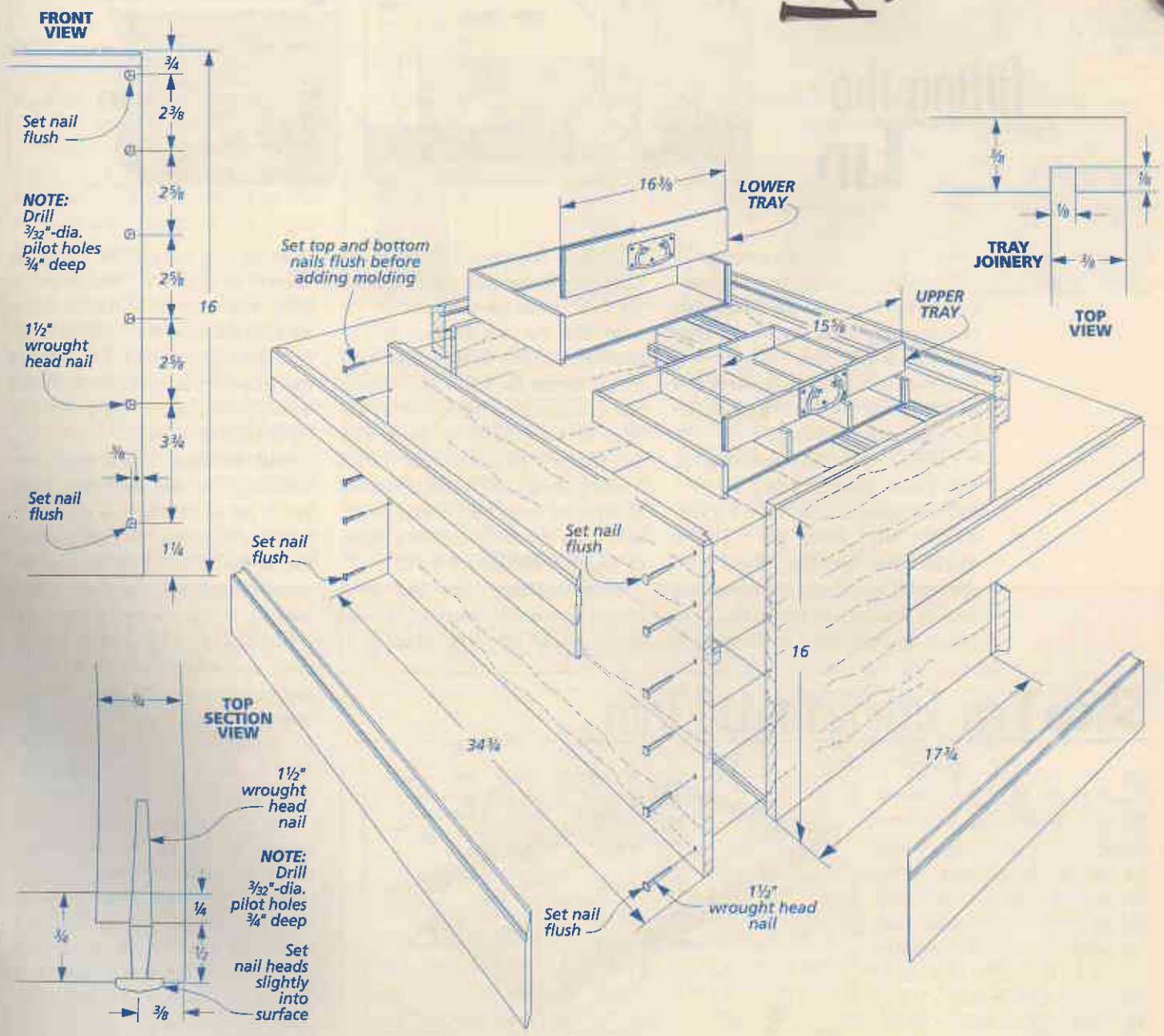


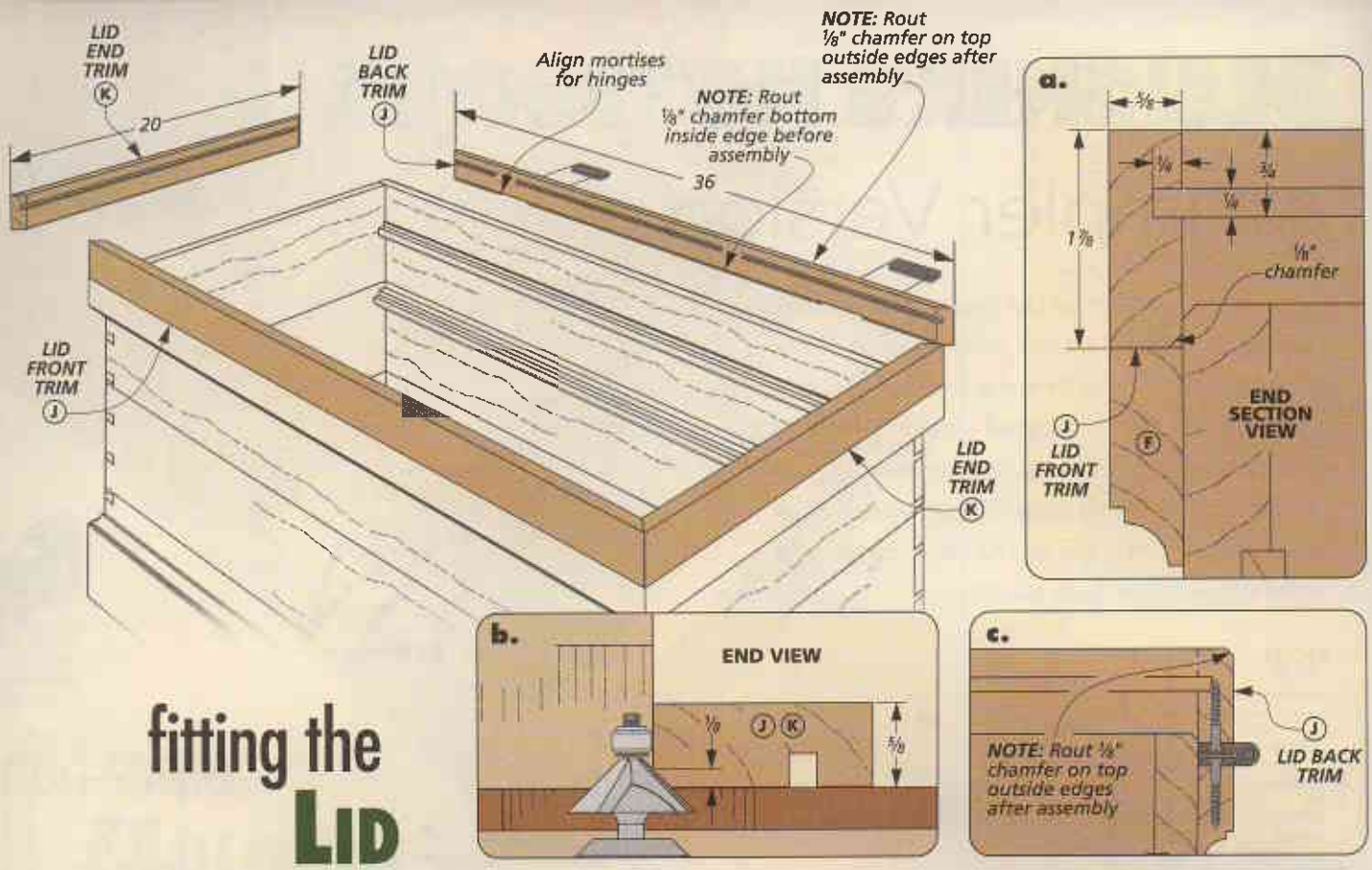
Create Shoulder. *To create a square shoulder at the base of the cove, I cut a shallow rabbet along the edge of the blank.*

DESIGNER'S NOTEBOOK

A Simpler Version

For a simpler version of the tool chest, you can substitute a basic rabbet joint in place of the dovetails. (You'll have to make the end panels 1" shorter than the dovetailed version.) Then to give the chest a traditional look, I reinforced each joint with some decorative, wrought-head nails. To replace the dovetails on the two sliding trays, I used tongue and dado joints.





fitting the LID

Once you have the case completed, you can turn your attention to making the lid. Basically, the lid consists of a panel captured by a frame. Then this frame and panel assembly is wrapped with some trim pieces that match up with the upper molding on the case of the tool chest.

I started on the lid by making the trim pieces first. This may sound a little backward, but there's a reason for this. Since the lid trim pieces have to end up flush with the molding around the top of the case, I wanted to make the trim pieces and cut them to size first to fit around the case. Then you can make the frame and panel assembly to fit inside the trim pieces.

LID TRIM. As you can see in the drawing above, there really isn't much to the lid trim. Each piece has a chamfer on the lower, inside edge and a groove on the inside face that will be use to hold the lid frame pieces later. I made the lid trim pieces extra long to start with, and then carefully mitered them to length to fit around the case.

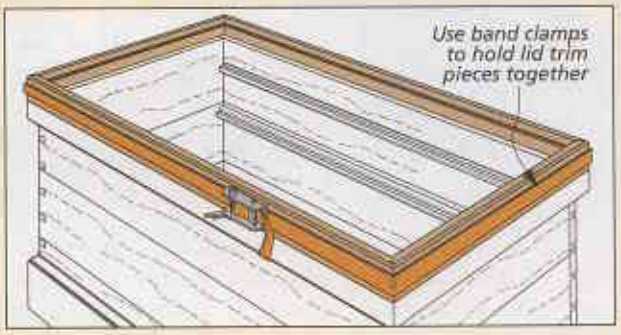
HINGE MORTISES. With the trim pieces mitered to length, the next step is to cut a pair of hinge mortises in the back trim piece, as shown in detail 'c.' You want to make sure that these mortises line up with the ones that you cut in the case molding earlier. Once these mortises are cut, you can set the lid trim pieces aside while you work on the rest of the lid.

FRAME AND PANEL. If you study the drawing on the opposite page you'll get an idea of how the entire lid goes together. As I mentioned earlier the center of the lid is made up of a frame and panel assembly. Making this frame and panel isn't difficult. It's nothing more than a basic stub tenon and groove frame surrounding a solid wood panel. But the trick is to size the frame to fit inside the trim pieces you've already made, and then to size the panel to fit in the frame.

The first step is to make the rails and stiles for the frame. When you're sizing these pieces, keep in mind that you'll need to allow for a ¼"-wide tongue all around the frame to allow it to fit in the grooves in the lid trim pieces. (You can see this tongue in detail 'c' on the opposite page.)

Shop Tip: Fitting the Lid Trim

To check the fit of the mitered lid trim pieces, I dry assembled them around the case, using a band clamp to hold the pieces together. Clamping up the pieces beforehand also allowed me to take measurements for the frame and panel assembly that makes up the rest of the lid.



After you've cut the rails and stiles for the frame to size, you can start on the stub tenon and groove joints that hold them together. Details 'a' and 'b' and the box at the bottom of the page will give you details on the joinery.

LID PANEL. With the joinery on the rails and stiles complete, you can glue up the blank for the lid panel and cut it to size.

If you take a look at detail 'c,' you'll notice that a groove is cut all around the edge of the panel to create a tongue that interlocks with the groove in the frame. But to allow the solid-wood panel room to expand and contract, I left a small expansion gap along the long edges of the panel, as you can see in detail 'c.'

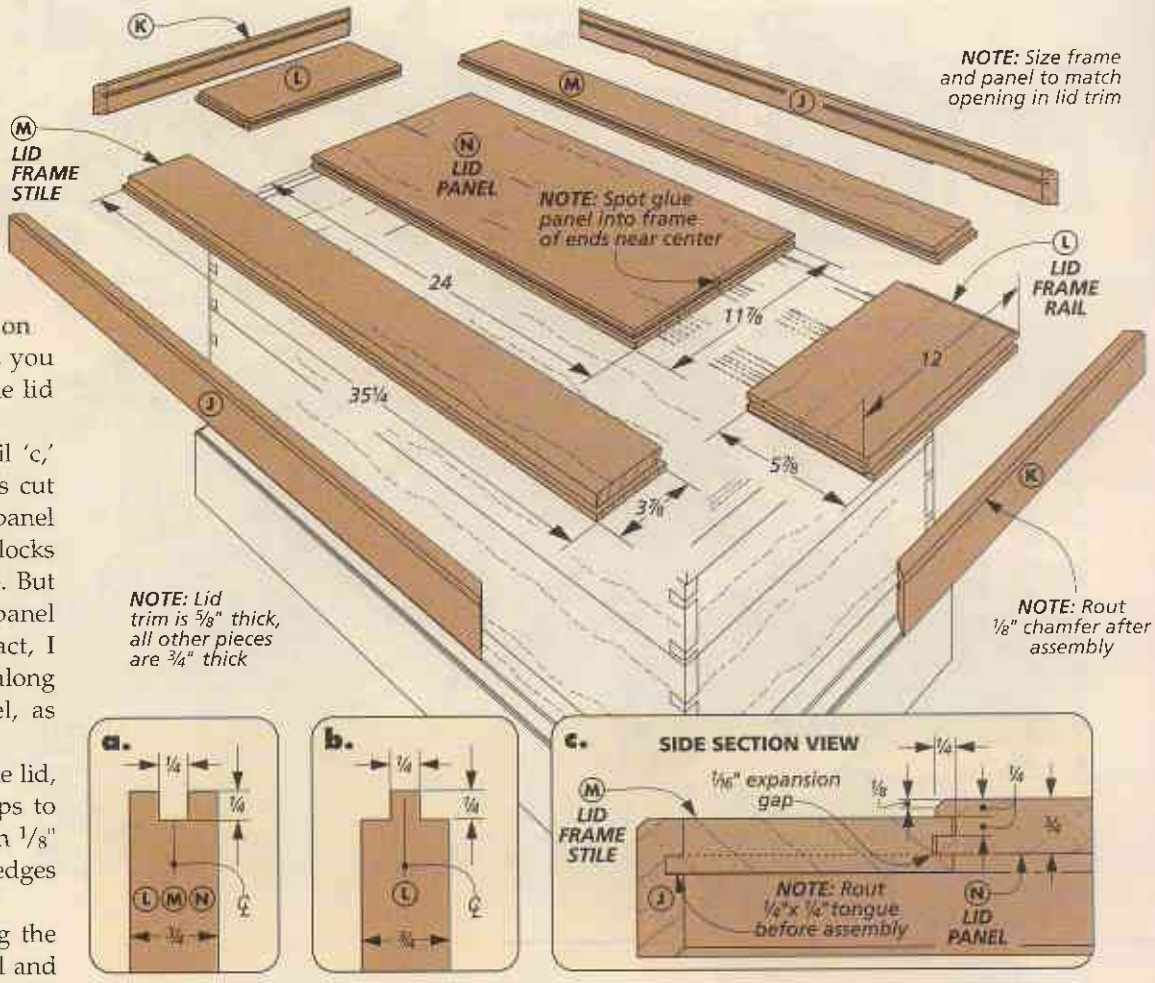
Before you can assemble the lid, there are a couple more steps to take care of. First, I routed an 1/8" chamfer all around the top edges of the lid panel.

Next, I cut a tongue along the outer edge of each frame rail and on the ends and outer edges of the frame stiles. This tongue is sized to fit in the grooves in the lid trim pieces. But you also need to size the overall frame and panel assembly so it fits snug inside the lid trim. This all requires some careful attention to detail.

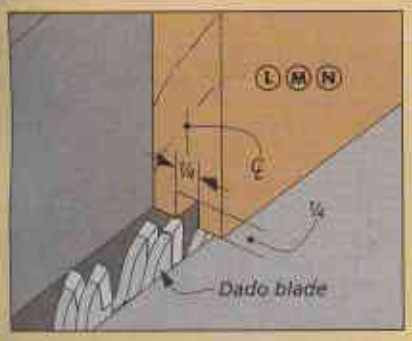
ASSEMBLY. At this point, you're ready to assemble the lid. I started by gluing up the frame around the lid panel. The only thing to note here is that you don't want to glue the panel completely into the frame. Instead, just use a drop of glue at each end of the panel to keep it centered. This way, the panel can still expand and contract with seasonal changes in humidity.

After gluing up the frame and panel, you can add the lid trim. These pieces are simply glued up around the frame.

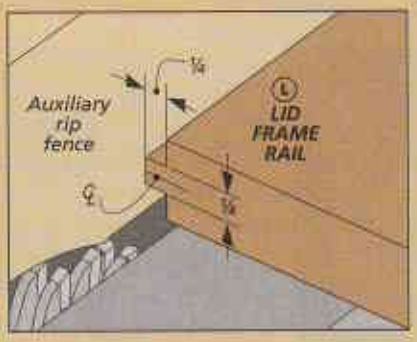
CHAMFER. The last step to complete the lid is to rout a chamfer all around the outside edge, as shown in detail 'c' above. Then you can move on to making the trays.



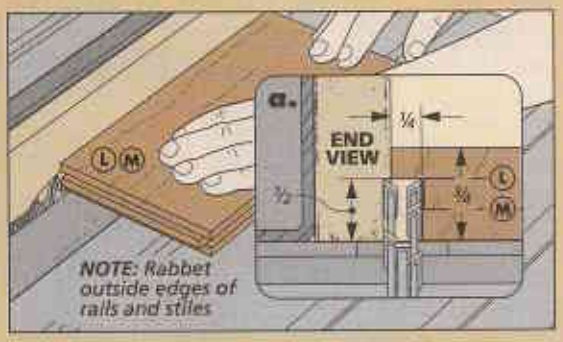
How-To: Stub Tenon & Groove Joinery



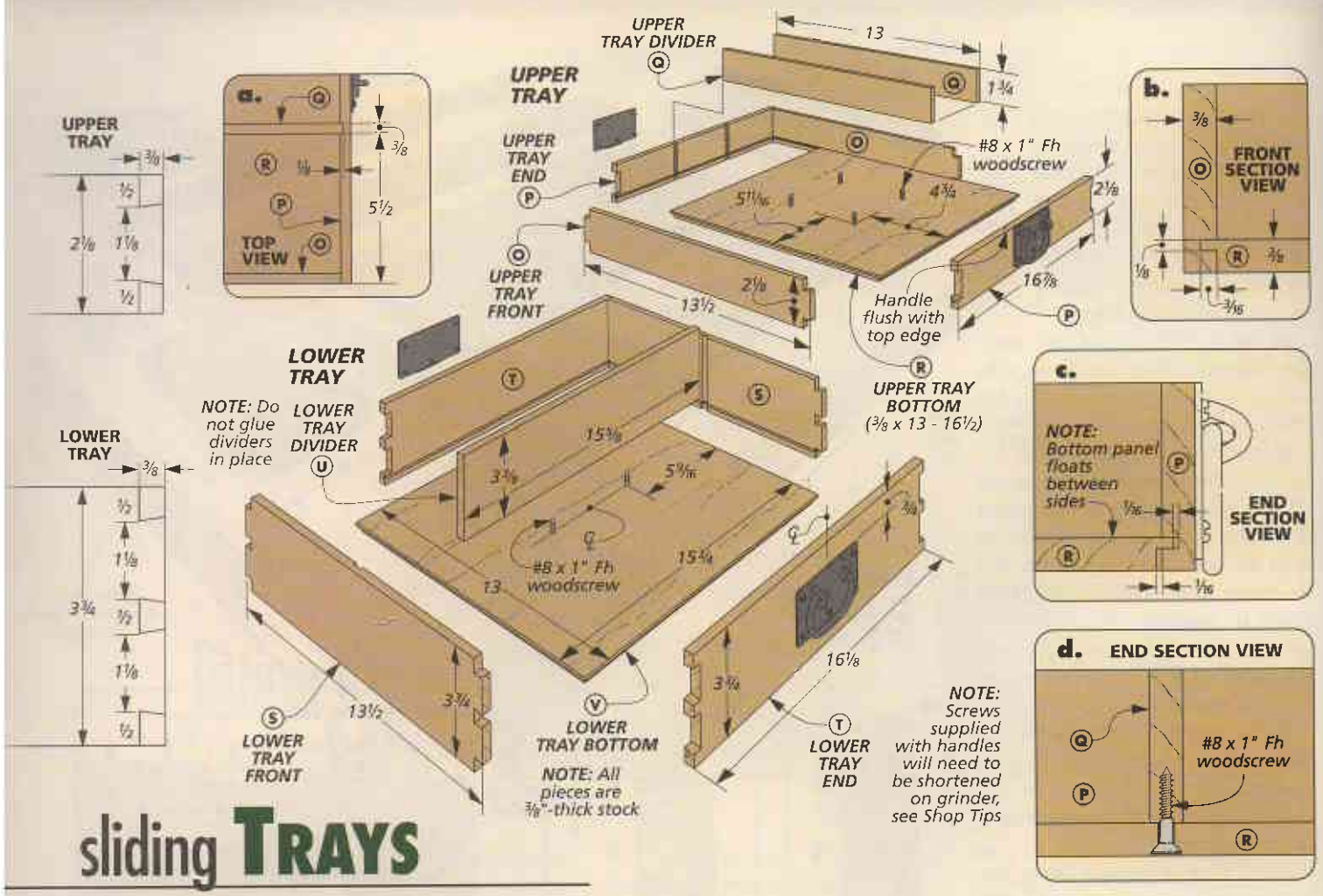
Cut the Grooves. *With a dado blade installed on your table saw, cut a centered groove along the inside edge of the rails and stiles of the lid frame.*



Size Tongues to Fit. *Next, bury the dado blade in an auxiliary fence and cut a centered tongue on each end of the rails to fit the grooves in the stiles.*



Fit the Frame Pieces to the Lid Trim. *Before gluing up the frame and panel, cut a tongue on the outer edges of the frame pieces as well as the ends of the stiles to fit in the grooves in the lid trim pieces.*



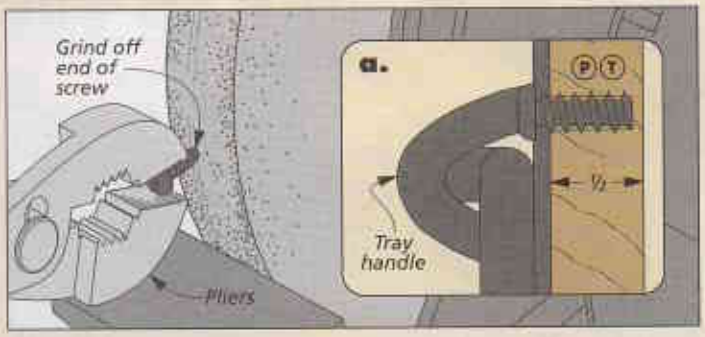
sliding TRAYS

With the basic tool chest complete, the only thing that remains is to add a couple of sliding trays and some hardware. If you take a look at the drawing above, you'll see that the two trays are each a different size. The shallow, upper tray is for small tools that might get lost easily. The lower tray is a bit deeper for larger tools that you want to keep protected but still close at hand.

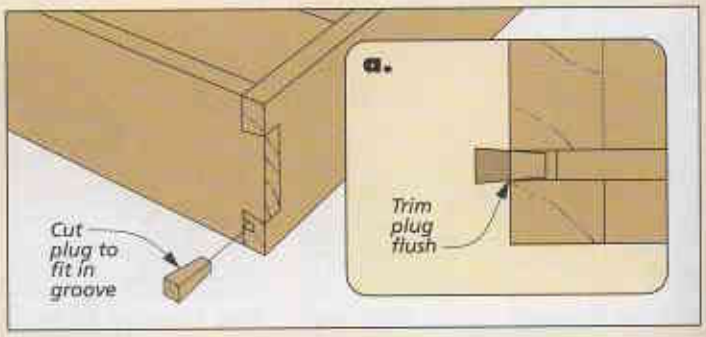
In addition to the difference in depth, you also notice that the lower tray is a little bit shorter from front to back than the upper tray. The reason for this is simple. The lower tray has to be shorter in order to allow you to lift it out past the runners for the upper tray.

DOVETAILS. Aside from these differences, the construction of the two trays is more or less the same. Each one consists of a front, back, and two ends joined together with dovetail joints. The lower tray uses two dovetails at each corner while the pieces for the upper tray are joined with just a single dovetail. Since there are a lot fewer dovetails to make than on the case of the tool chest, you might want to try cutting these dovetails by hand instead of using a jig.

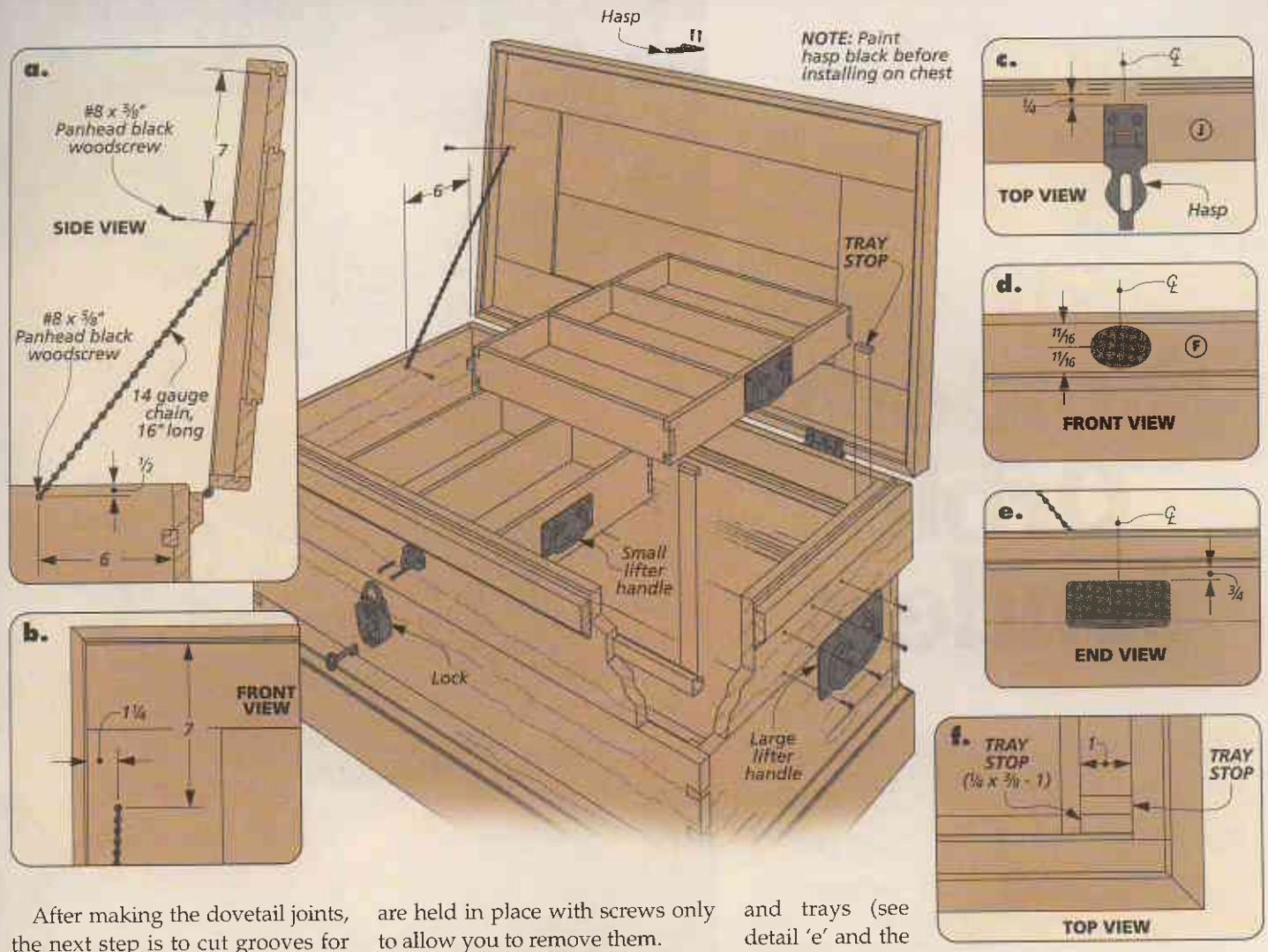
Shop Tips: Final Details



A Real Grind. *The screws that were supplied with the handles I used on the trays were a bit too long for the thickness of the stock I was using. So I carefully ground down the end of each screw.*



Plug the Grooves. *To conceal the ends of the grooves for the tray bottoms, I glued a small tapered plug into the end of each groove. Then after trimming the plug with a hand saw, I sanded it flush.*



After making the dovetail joints, the next step is to cut grooves for the tray bottoms and dadoes for the tray dividers. Details 'a' and 'b' on the opposite page will give you more information on these.

TRAY BOTTOMS. Like all the other parts of the tool chest, the tray bottoms are glued up out of solid wood. So when sizing these pieces, I again allowed for $^1/_{16}$" clearance gap along the edges for wood expansion. Then once the bottoms are cut to size, a tongue is cut on all four edges to match the grooves in the tray pieces, as shown in detail 'c' on the opposite page.

DIVIDERS. The last pieces to make before assembling the trays are the dividers. These are simply cut to fit between the dadoes in each tray.

ASSEMBLY. Assembling the trays is simply a matter of gluing up the fronts, backs, and ends around the tray bottoms. The tray bottoms don't get glued in place — they are allowed to "float" in the grooves instead. Likewise, the dividers aren't glued in place either. They are held in place with screws only to allow you to remove them.

Before moving on to the hardware, there are a couple of details to take care of. First, I plugged the exposed ends of the grooves for the tray bottom, as shown in the box on the opposite page.

Then to prevent the trays from bumping against the ends of the chest, and to create some clearance to lift the trays out of the chest, I added stops to the ends of each runner. These are nothing more than small blocks of wood that are sized to fit in the rabbets and then glued in place. You can see them in the drawing above and in detail 'f.'

HARDWARE. One of the things that really makes this tool chest stand out is the authentic-looking hardware. (For more on the hardware I used, see the article on page 46 and sources on page 49.) As soon as I applied a finish to the chest, I began installing the hardware, as shown in the drawing above.

You can start by attaching lifter handles to the ends of the chest and trays (see detail 'e' and the box at the bottom of the opposite page). Next, the lid is mounted to the chest by installing the hinges and the lid chain (details 'a' and 'b'). Finally, I added the hasp and padlock to the front of the chest to complete everything (details 'c' and 'd'). W

Optional Tool Holders

The underside of the lid of the tool chest is the perfect place for storing a couple hand saws (or any other flat tool). To hold the saws securely and prevent them from rattling around, I added some customized tool holders (see photo below). For more on making these and installing the tool holders, turn to Shop Notebook on page 30.

the right spin on Random Orbit Sanders

Make the tedious work of sanding easier by using these tips and techniques to get the most out of your random-orbit sander.

Of all the tasks in woodworking, sanding has got to be my least favorite. But it's also one of the most important steps to a good finish. The trick is to make sanding less of a hassle, yet still get good results. And one of the best tools for that is a random-orbit sander.

HOW IT WORKS. A random-orbit sander works by spinning sandpaper two different ways at the same time. Imagine a child's spinning top — as the top slows down, it begins to wobble in a looping pattern. That's the motion of a random-orbit sander.

The size of these loops, called orbits, can range from 3/32" to 1/4". Larger orbits are more aggressive in removing stock. Smaller orbits generally leave a smoother finish, because they continuously overlap swirl marks to help hide them.

SANDERS. Random-orbit sanders come in 5"- or 6"-inch pads. For me, I like the 5" sander, because it's small and can easily be used with one hand. And it's so lightweight that I can use the sander for quite a while without my arms and shoulders getting tired out.

SANDPAPER. Another great feature of random-orbit sanders is how easy it is to change sandpaper, called disks. There are a couple of options for attaching the disks, depending on the sander. Some use adhesive-backed disks, and others use hook and loop, which is similar to *Velcro*. You can also buy replacement pads to accept the other type of backing, if you want it to.

To attach the adhesive disk, you just peel the protective backing off the sanding disk, press the disk onto the pad, and start sanding. When it's worn out, simply peel the disk off and throw it away.

A disadvantage to adhesive-backed disks, though, is that they really cannot be re-used. Dust and dirt can get trapped in the backing, resulting in a disk that's not so sticky anymore. Plus, that debris may cause the disk to become "lumpy" and leave unwanted scratches in your workpiece.

That's why I really like the convenience of the hook and loop. Switching from a coarse disk to a finer disk is easy, and you don't have to worry about dirt getting stuck to the backing. You can change grits before the disk is used up — just put the disk back in its box until you need it again. This allows you to use the disks over and over again until they're completely worn out.

One thing you'll notice about these sanders and the disks is the holes in them. These holes serve as part of the sander's dust-collection system. Just make sure the disks you buy have the same number of holes as your sander.

Other options available on random-orbit sanders are variable speed and dust control. You can learn more about them in the box at the bottom of this page.

SWIRL-FREE TECHNIQUES

To get the most out of a random-orbit sander, the techniques for using them are quite different than other types of sanders. The key thing to remember when you're using a random-orbit sander is to let the sander do its own work.

NO PRESSURE. With most any other sander, I sometimes try to help it out by adding a little extra pressure on it, especially if I'm trying to sand out a gouge or get a few extra strokes from worn-out sandpaper. While that technique works with other styles of sanders, it actually reduces the effectiveness of a random-orbit sander.

Adding pressure or weight to a random-orbit sander slows the motor and keeps the orbiting action of the sander from doing its job. Add enough pressure, and you can stop the sander's motion altogether, causing the motor to overheat and shortening the sander's life.

STARTING & STOPPING. Starting and stopping your sanding motion can be a little tricky. What works best for me is to treat the sander as an airplane taking off and landing.

When I start sanding, I hold the sander over the workpiece and turn it on. As it picks up speed but before it reaches full speed, gently lower the sander onto the workpiece and begin sanding. Make sure the sanding pad is flat when it touches the wood. When I'm finished, I lift the sander off the workpiece — like an airplane taking off — and then turn the sander off.

SLOW DOWN. Probably the most misunderstood technique of using any sander is how fast to move it across the workpiece. I've seen woodworkers race their sanders helter-skelter over their workpiece. That doesn't reap the benefits of a random-orbit sander, and it leaves very visible swirl marks. Here's how I get the best results.

Give the sandpaper time to work. The sander helps hide swirls by overlapping them. The slower the sander moves across the workpiece, the less visible the swirls become. A good rule of thumb is to cover about 1" per second.

STAY ON TRACK. While slower speed helps, keeping track of your sanding pattern helps too. If you need to remove a lot of material, start with a coarse-grit disc. Move the sander across the grain in a deliberate and steady side-to-side motion. Also, overlap the "rows" to, again, hide swirls.

Next, switch to a finer grit and move the sander with the grain. Same speed and motion. Keep the sander flat to prevent gouges and stay in constant motion to prevent dips and hollows. Finally, if you still see swirl marks after all this, take the sanding disk off and hand-sand the area smooth.

By following these simple steps, you'll not only reduce swirl marks, but you'll improve the finished surface of your project. W

Unlike an adhesive-backed sanding disk, a hook-and-loop disk can be changed easily and stored for later use.

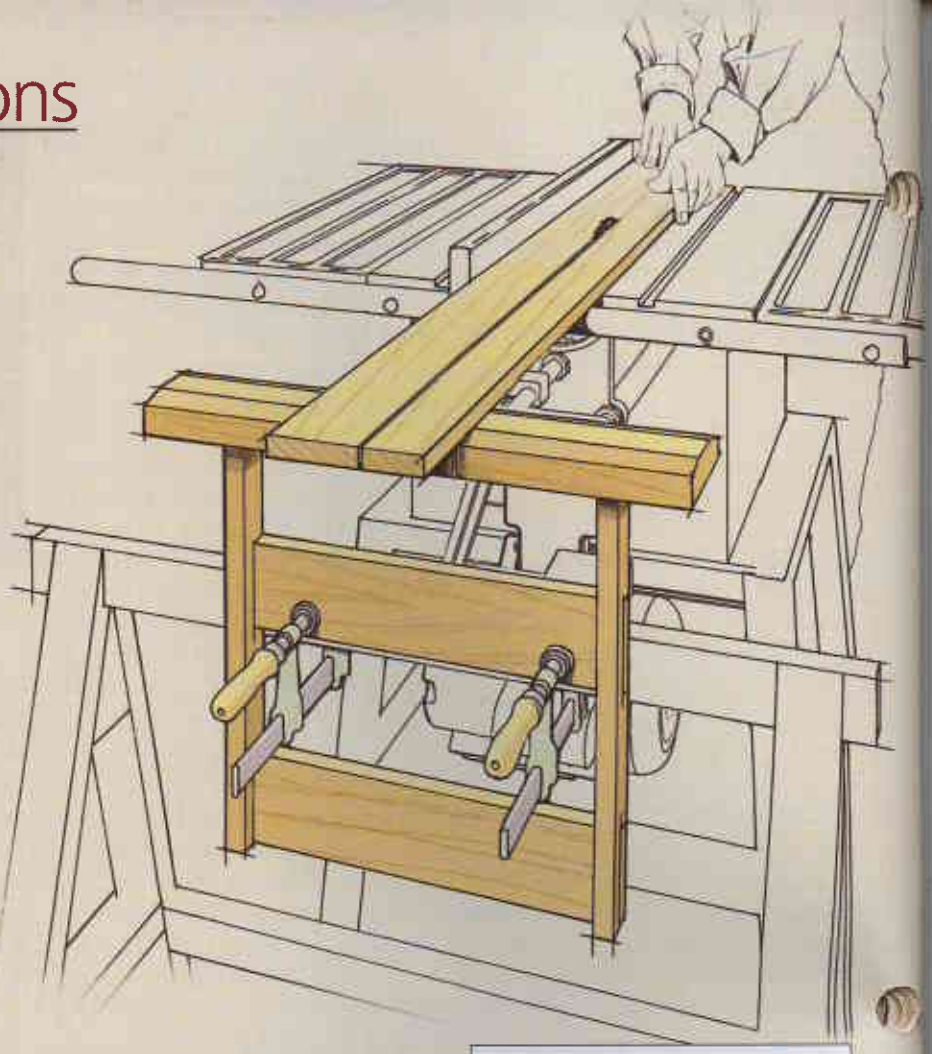
Options: Speed & Dust Control

Two features that are must-haves when choosing a sander are variable speed and a dust collector that can connect to a shop vacuum. Variable speed slows the sander down from as fast as 12,000 RPM to as slow as 4,000. A vacuum attachment can make the sander virtually dust-free.

Variable speed reduces the disk speed to allow you more control over the sander. More control makes it less likely you'll make such sanding mistakes as sanding through veneer or rounding over edges.

Most random-orbit sanders come with a dust bag, but many can be attached to a shop vacuum, saving you the hassle of emptying dust bags that fill quickly.

table saw ripping: Tough Cuts made easy



Does the thought of ripping long stock on the table saw make you cringe? Some good outfeed support might be the answer.

Of all the tasks I do at the table saw, ripping long pieces of stock safely and accurately is one of the biggest challenges. The problem is that to get a good result, there are a number of things you have to pay attention to — all at the same time. You're trying to keep a large, bulky piece of stock tight against the rip fence while feeding it into the blade and keeping your hands safely out of the way. And if this isn't enough, how do you manage to keep the long board flat on the saw table all through the cut? Well, I've found that one way to making this tough job easier is with some well-placed outfeed support.

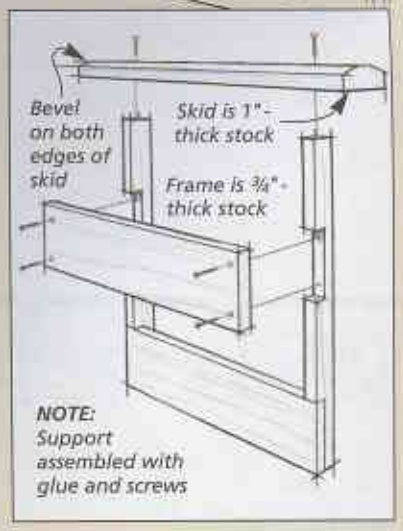
THE PLUSES. Good outfeed support takes one big concern "off the table." It allows you to concentrate entirely on accurately feeding the stock. Your feed rate will be more consistent and the cut smoother and "burn-free." And there's less chance of the stock wandering away from the fence, so the cuts are more accurate.

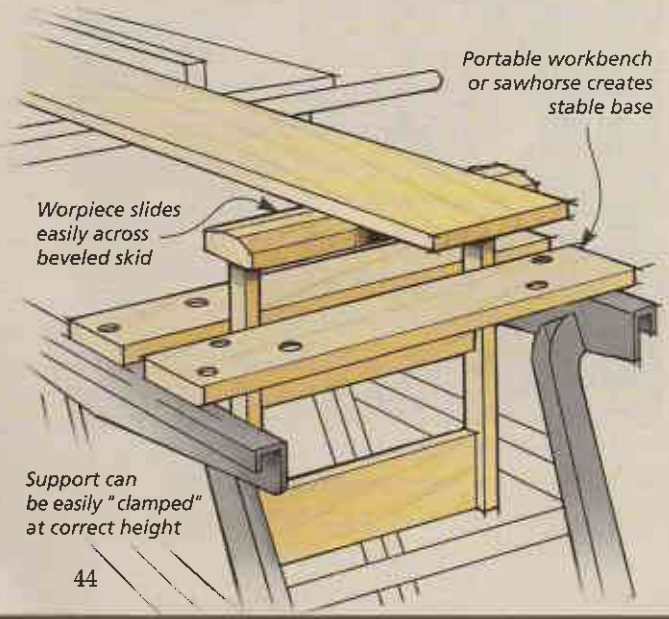
But most important is the safety factor. When you have perfect control of the stock, there's much less chance of something going wrong.

A SIMPLE SUPPORT. Most of us don't have the space in our shop for a large, permanent outfeed table. Folding roller stands can be a good option. But if you don't have one, there's another easy solution. As you see in the drawings on this page, a simple, shop-built outfeed support can work just as well.

This support costs next to nothing to build and the finished product is lightweight, compact, and easy to store. Just hang it on the wall. And here, a portable workbench or sturdy sawhorse gives the support a wide and very stable stance.

Instead of a roller, this support uses a wide, beveled hardwood skid to support the workpiece. The narrow support surface creates minimal resistance for a straight, easy feed. And the beveled edges ensure that the workpiece won't hang up.





SET IT UP RIGHT

To make an easy job of hard-to-handle rip cuts, your outfeed support needs to be positioned where it will do the most good.

WHAT HEIGHT? The first thing to think about is setting the support to the correct height. The perfect support height depends on the type and thickness of stock you're ripping. You can be pretty sure that thick stock (1" plus) won't sag much as it comes off the saw table. So here, I generally set my support level to the table or just a hair below. But be sure to avoid setting the support so high that the workpiece catches on the skid. You can expect thin or narrow stock to droop a bit, as in the top drawing at right. Just drop the support slightly below the surface of the saw table to account for this.

PROPERLY ALIGNED. Next, the support stand needs to be properly aligned with the workpiece as it comes off the saw table *and* also set up so that it's parallel to the surface of the table.

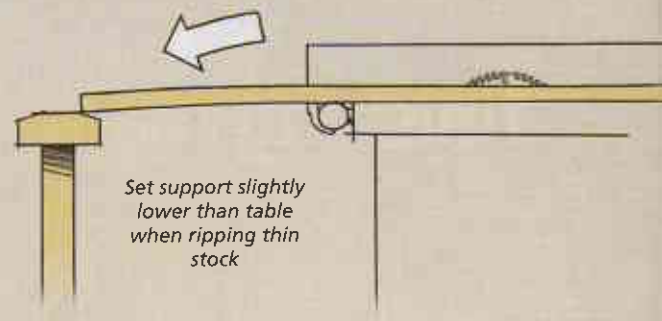
When I position the stand side to side for a cut, I don't think in terms of centering it on the blade. You need to think about supporting the entire board. Generally, this means centering the support (more or less) on the workpiece (lower right drawing). But the important thing is that the support stand carries both "halves" of the ripped board.

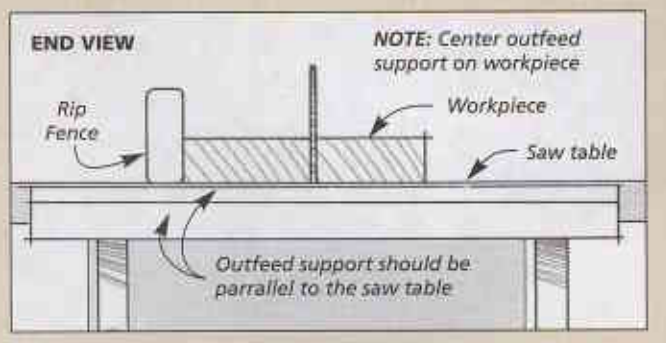
Next, you can squat down behind the support and sight across it to make sure it's parallel to the table. This can be pretty important to making a tough job easier. If one side is low (or high), it can cause the board to twist and bind against the saw blade or go off line.

THE PERFECT DISTANCE. The final question is, "How far from the saw table do you place the support?" And as you might expect, this depends on the length of your board.

At the beginning of a rip cut, the saw table (and you) support the workpiece. But once more than half the length of the board is beyond the table, it starts to tip downward. This is when support is a must.

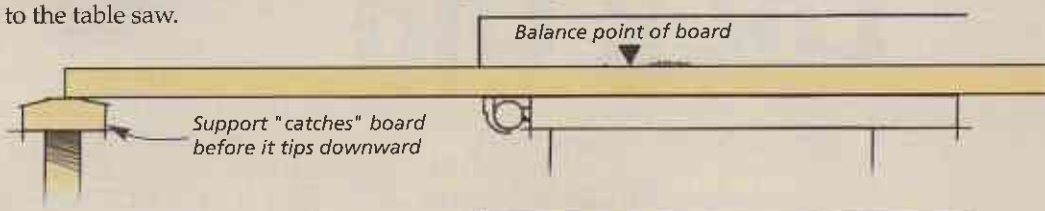
So, your first consideration is to place the support close enough to the table saw to catch the workpiece before it reachs this "tipping point" (top drawing below). But on the other hand, when you push the workpiece past the blade at the end of the cut, you don't want it to pivot up and off of the saw table. This means that you need to avoid placing your outfeed support too close to the table saw.

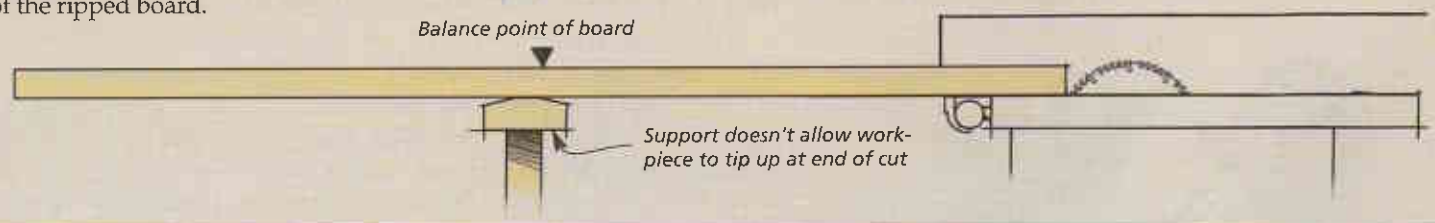




Positioning the support so that it does the job from the beginning to the end of the cut is actually pretty easy. It turns out that this perfect support position is just a little less than half the length of the board from the back edge of the saw. You can just make a rough guess on this position and it'll work out fine.

And now with the outfeed support carrying the load, tough rip cuts are a thing of the past. W

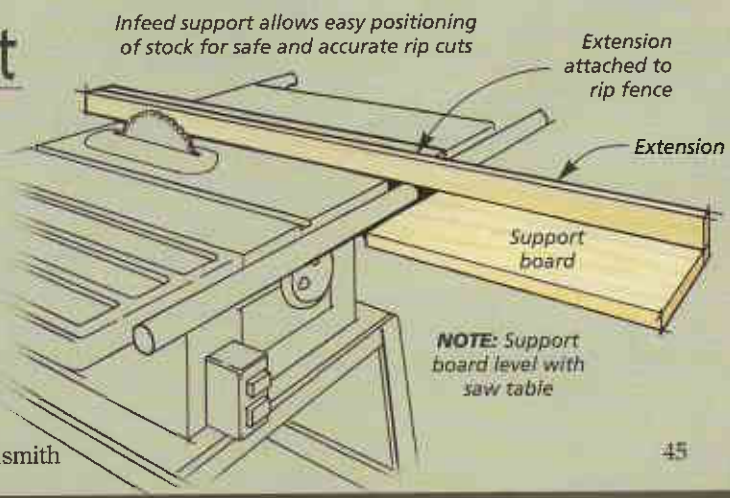




Another Helper: Infeed Support

Good outfeed support is a must for safe, accurate ripping, but there are also times when a little help with infeed support can make a cut a lot easier. So when I have a large, awkward plywood panel or board that I need to accurately position for a cut, I install the simple in-feed support shown in the drawing at right.

The infeed support is simply a fence extension attached to the rip fence that holds a wide support board level with the saw table. You can use this helper along with an outfeed support stand to give you complete control — before, during, and after the cut.



making the new **Look Old**

It takes years for a piece of furniture to become well-worn and aged. But with just a few simple steps, you can create an "instant" antique.

A couple ordinary tools and some pieces of hardware are all it takes to mimic the wear and tear on an antique that usually takes decades to develop.

Whenever I build a project, I do my best to make it look perfect, from the joinery and assembly, to the final sanding and finish. You can see that in the heirloom tool chest on page 32 — even with its old-fashioned design and rustic hardware (see box on opposite page).

But over time, as the project ages and gets handed down from one generation to the next, it becomes an antique — with all the dents, dings, and patina you'd expect.

SPEEDING UP THE PROCESS. So what do you do if you don't want to wait for that to happen? In the photo above, you can see how we added wear and tear to turn the tool chest into an "instant" antique. And the nice thing is, it only takes a couple hours using nothing more than a few common "tools" (photo at left).

But before you start, you want to be sure to keep the look realistic. So it's a good idea to think about the kinds of wear and tear a piece of furniture might show after a hundred years — and where you would see it.

Furniture and projects that rest on the floor, like a tool chest, get moved around a bit. So you can be sure that sharp edges and corners will end up rubbed and rounded over. And the lower third of a project gets the brunt of mops and brooms over the years — with dents and dings to show for it.

Another area that sees a lot of abuse is the top of a project. At some time or another, just about everything gets set, dropped, and dragged across it. And just like the lower parts of a piece of furniture, the edges will get banged and bruised as well.

ADDING WEAR & TEAR. There are a number of ways to duplicate all this wear and tear. Sandpaper makes quick work of knocking off sharp corners. But a freshly sanded edge isn't something you'd see on an antique. To give the edge the smooth, well-worn feel that develops over time, run the shank of a screwdriver along the edge to burnish it (top drawing at right).

Burnishing these areas also helps out when it comes time to apply a stain or wax later. They won't absorb as much of the stain or wax. So they'll stay lighter than the rest of the project — which is exactly what would happen after years of use.

When it comes to the top of a project, you can add "age" with a ring of keys. Simply tie a piece of string to the ring and then bounce or swing the keys against the surface. Depending on the effect you're looking for, you may have to use a bit of force here.

Or for something really simple, you can cut the head off a screw or bolt. Then just tap the threads against the surface or near an edge lightly with a hammer (lower drawing at right and main photo on opposite page).

INSECT ATTACK. Once I've "worn" the project, I add another detail often seen on old furniture — and that's insect damage. For this, all you need is a piece of wire and a sharp point.

An awl makes quick work of placing a few tell-tale exit holes (middle drawing at right). And a bent piece of wire tapped into the surface mimics the look of a tunnel (lower drawing).

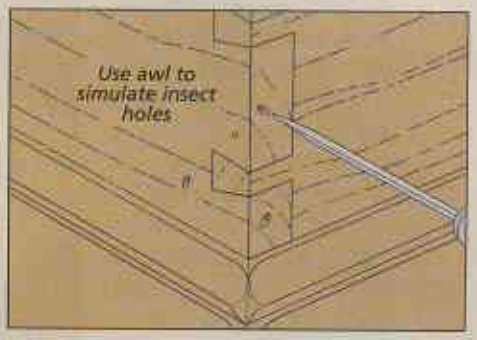
HIGHLIGHT THE MARKS. At this point, what you've done is probably a little hard to see. So the last step is to highlight the wear and tear and give the project its final look, or patina.

The patina on an antique is the result of years of exposure to light, dirt, grease, and wax. But you can get a head start on this process in a couple different ways.

For the project you see in the main photo, I simply rubbed on a coat of colored wax (*Briwax Tudor Brown*) and then buffed it out once it was dry. And don't worry about wiping the wax off evenly. A little extra in the dents, dings, and corners mimics the look of built-up grime.

FINAL THOUGHT. There's one last thing I'd like to mention. Putting in a few nicks and dents is one thing — just don't get carried away. Be sure to keep things random and do just enough. This way, you'll end up with the "instant" antique you're looking for. W

Relieving Edges. *Add wear and tear to the edges and corners with sandpaper. Then burnish with the shank of a screwdriver.*



Insect Damage. *All it takes is a few stabs with an ordinary scratch awl to form the entry and exit holes made by insects.*

Final Details. *You can form insect "tunnels" with a piece of wire and add "character" by tapping the threads of a screw into the surface.*

Hardware: Adding The Aged Accent

Wear and tear is just one way to make a project look old. But there's another step that's just as important — and that's using the right hardware.

You're not likely to see shiny brass hardware on a project that's been around for some time. So you'll want to select hardware that looks as if it's been around just as long.

For the heirloom tool chest, we used the hardware you see at right. *Van Dyke's Restorers* has this iron hardware handcrafted and hand-forged, so it's a perfect look. (For sources, turn to page 49).

Note: The actual sizes of the hardware may vary slightly from what's listed in the catalog. So it's a good idea to have the hardware in hand before you build a project.

The hardware shown comes in a variety of finishes, including, rust, antique brass, and iron. I chose a black iron finish for the chest. But there is one problem — the hasp isn't available in black iron. So I took care of that with a little black spray paint.

▲ Authentic-looking, rustic hardware, like you see above, is a good way to make a project look as if it's been around for years.

in the mailbox

Questions & Answers

Router Burn

Q ***When I use my router, I often end up with dark marks on the workpiece. What am I doing wrong?***

Ed Soule
Kimball, Nebraska

A The dark areas on the workpiece (see inset photo at right) are a result of heat buildup during routing. And several things can cause this.

DULL BITS. First, it goes without saying that a sharp router bit cuts better than a dull one. The same principle applies to preventing router burns.

A dull bit produces more friction since it doesn't shear the fibers cleanly. This means heat builds up around the bit. And the natural resins (that sticky substance you sometimes see oozing out of the wood) also heat up. The result is a visible burn mark that's quite difficult to sand away.

So it's a good idea to inspect your bits regularly. And sharpen or replace them as they become dull.

RESIN BUILDUP. You'll also want to check the bit to see if there's any resin built up on it. When resin sticks to the router bit, it forms a coating on the bit. Again, this coating makes the bit run hot. And as a result, it heats up and leaves a burn mark.

Many of the man-made materials also have resins in them. So if you're using a lot of plywood and MDF, you'll find resins can build up on the bit quickly.

You can use a mild solvent, like paint thinner or denatured alcohol to remove the resin. You'll also find cleaners specifically for this purpose available in many woodworking stores.

But even if your bits are clean and sharp, you can still get router burn. So it's also important to use good routing technique.

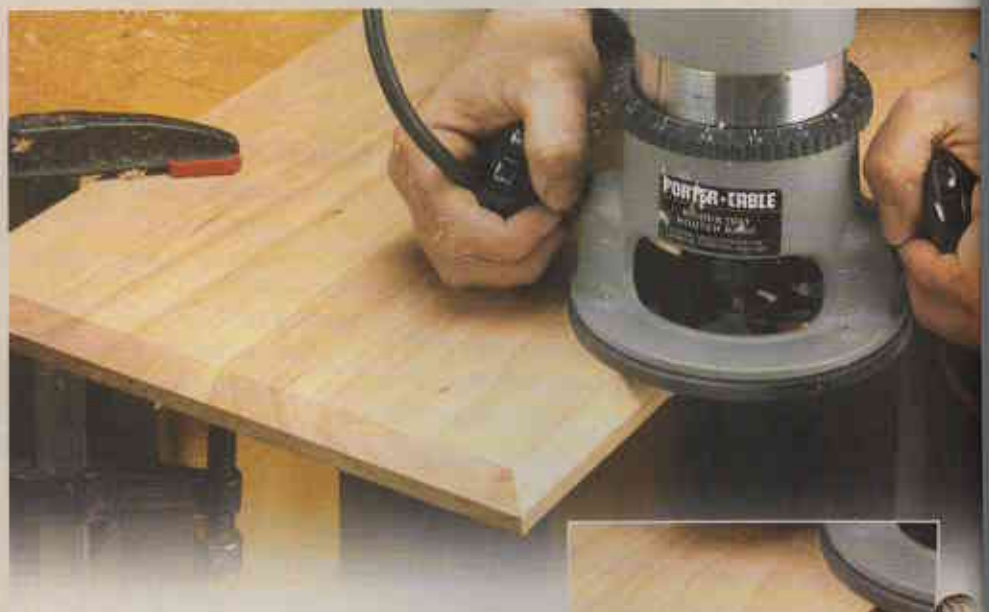
FEED RATE. Any time you slow down, hesitate, or stop while making a cut, the bit continues to spin at a high rate of speed. This heats up the area and ends up leaving a visible mark on the workpiece.

The best feed rate depends on the type of wood you're using, direction of the grain, size of the router, and the shape of the bit. But as a general rule, "faster is better." That way the heat doesn't build up around the bit.

DEPTH OF CUT. Another common error is taking too deep of a cut. This slows the feed rate and makes burning the workpiece more likely. So, unless the cut is light, it's better to make multiple shallow passes.

I usually try to make several 1/4" deep passes to remove the bulk of the material. And then I make one quick, 1/16"-deep pass as a final step.

Router burn marks are hard to remove. So a little prevention can really save you a lot of time. W



▲ Stops and pauses when routing can leave burn marks in the wood.

Do you have any questions for us?

If you have a question related to woodworking techniques, tools, finishing, or hardware, we'd like to hear from you.

Just write down your question and mail it to us: Woodsmith, Q&A, 2200 Grand Avenue, Des Moines, Iowa 50312. Or you can email us the question at: woodsmith@woodsmith.com.

Please include your full name, address, and daytime telephone number in case we have questions.

Sources

TRADITIONAL TOOL CHEST

One thing that gives the tool chest on page 32 a really authentic look is using the right hardware. Almost all of the antique-looking hardware I used for the project came from *Van Dyke's Restorers.*

This hardware includes the small, heavy-duty cabinet hinges (#02014884), medium black lifter handles (#02007188) for the outside of the chest, and the small lifter handles (#02007187) for the inside trays. I also used a heavy iron hasp (#02004558) and a black steel padlock (#02014191) to secure the lid. I was able to find the chain and screws needed at a local hardware store.

To make it easier for you to build the tool chest, the *Woodsmith Store* has put together all the hardware you need in a single kit (#7161100). The kit is available at a cost of $89.99. Use the contact information in the right margin to order it.

You can cut the dovetails used to join the chest by hand. But if you use a router you'll need an adjustable dovetail jig that can rout through dovetails.

Many jigs will work, but I used the D4 jig made by *Leigh Industries.* You can order it directly from them. It's also also available from the *Woodsmith Store.*

If you're going to build the rabbeted-case version of the tool chest from page 37, you may want to get some wrought head nails. The 1½" nails I used can be found at either *Lee Valley* (#912240.03) or *Rockler* (#32379).

HONING GUIDE

Using a good honing guide makes sharpening your chisels and other cutting blades a lot quicker, easier, and more accurate. The *Veritas Mk. II Honing Guide* (#05M09.01) shown in the article on page 14 came from *Lee Valley.* It's also available from the *Woodsmith Store.* You should be able to find it for around $50.

SMALL ROUTERS

When it comes to doing detail routing, a small trim router makes the work a lot easier and hassle free. The *Colt Palm Router* (PR20EVSK) featured on page 10 is available from *Bosch Tools.* Their contact information is in the right margin. You can also purchase this router from the *Woodsmith Store.*

I was able to find the *Ridgid* R2400 laminate trimmer at a local *Home Depot.* You can get more details, as well as ordering information, from *Ridgid* by using the information in the margin.

INLAY MARQUETRY BOX

You won't need anything in the way of hardware to build the marquetry box. But you will need wood for the inlay blanks if you don't have enough scrap pieces. A number of different wood species in a variety of thicknesses can be found at *Inlay Product World* or from *Constantine's.*

You may want to find patterns to follow for cutting the inlays for the marquetry. Pattern books and other marquetry supplies can be ordered from the same sources.

CURVED-STRETCHER TABLE

You won't need much hardware to complete the accent table on page 22, but you will need a piece of glass for the top. Since you can't cut tempered glass to size yourself, you'll need some help. I built the top first and then ordered the glass to fit. The ¼"-thick piece of frosted, tempered glass I used came from a local glass shop.

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MAIL ORDER SOURCES

Similar project supplies may be ordered from the following companies:

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Leigh Dovetail Jig, Tool Chest Hardware Kit, Colt Palm Router, Veritas Mk. II Honing Guide

Rockler
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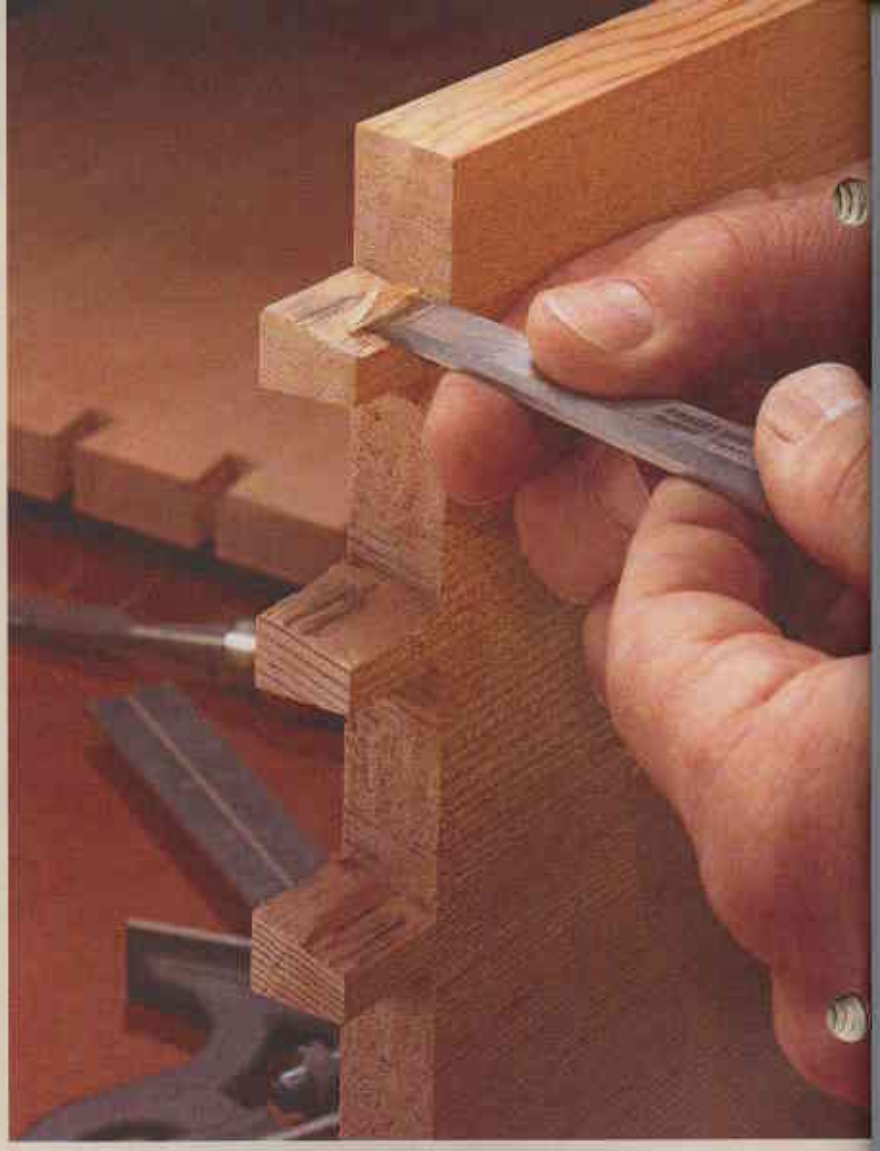
perfect-fitting Through Dovetails

It's knowing how to "tweak" the fit that makes the difference.

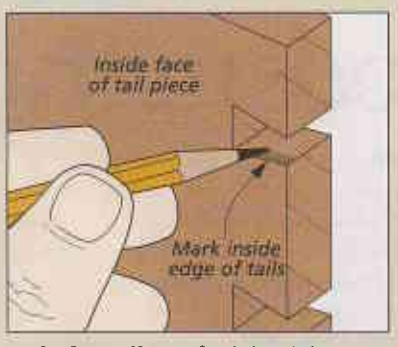


When you use through dovetails on a project, cutting them is only the first step. The real challenge comes in doing that little bit of extra work that gives you a seamless fit between the pins and the tails.

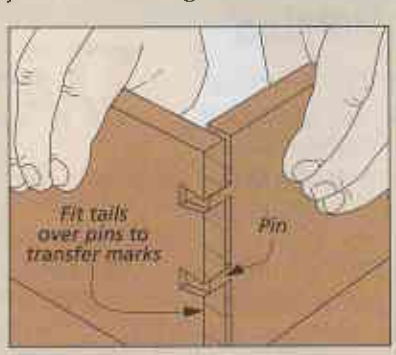
Whether you cut your dovetails by hand or with a jig, as I did for the tool chest on page 32, the final "tweaking" that gives you a perfect fit doesn't have to be tricky or tedious. It just takes a little patience and a few simple tips and tricks.

A GOOD DRY FIT. The first thing you need to think about is what kind of dry fit will lead to an easy assembly and a perfect-looking joint. What I try to shoot for is a fit that takes only light pressure to assemble. The tails should fit over the pins easily, requiring only firm hand pressure to force the joint most of the way home. A few light blows from a fist or gentle taps from a mallet will seat the joint tightly.

TOO TIGHT. If your completed joint is so tight that only forceful hammering will drive it together, you can expect problems. The tail piece can actually be split by the wedging action of tight pins. Or the outside edge of a tail can "blow out" as the joint is forced together.



Rub the Tails. *To find the tight spots between the pins and tails, first use the side of a pencil to mark along the inside edge of the tails.*



The High Spots. *When you press the tails over the pins, the graphite will rub off on the high spots and show you right where to trim.*

Another thing to keep in mind is that adding glue to the joint can make a big difference. Glue causes the wood fibers to swell slightly. So a joint that fits very snug when tested "dry" can end up being impossible to fit together once you have glue on the pins and tails.

TOO LOOSE. On the other hand, you want to avoid a joint in which the tails slide over the pins without any persuasion at all. If this is the case, you may end up with a weak joint and visible gaps between the pins and tails. And a sloppy joint will lose some of its built-in "locking" effect.

GETTING A GOOD FIT

How do you get the perfect fit? What works for me is to first cut the joint to fit on the snug side. The idea is that you want to be able to get the tails started over the pins with some firm pressure, but not much farther without extra force. At this point,

some careful trimming with a sharp chisel will get you to a perfect fit.

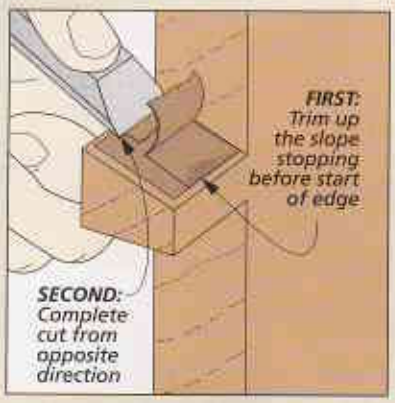
WHERE TO TRIM. You don't want to start trimming without knowing where the "tight spots" are that need work. The simple marking trick shown in the drawings on the opposite page solves this problem.

You'll notice that I'm marking and then trimming the tight spots on the pins. Since the sides of the pins are usually better exposed, it's easier to see the graphite that's rubbed off on the high spots. And it's easier to get at the pins to trim them to fit.

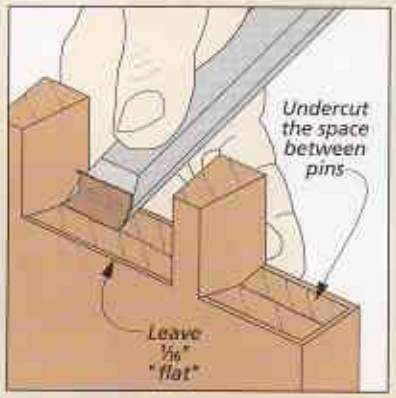
TRIM TO FIT. Once you know where to trim, you can get started. For this "fine tuning," my tool of choice is generally a 1/2"-wide chisel (photo at left). A narrow chisel allows you to make controlled cuts over a small area and get into tight corners. And it's easier to see what you're doing.

When I start to trim away the high spots, I pare from the side (crossgrain) rather than the end. Working crossgrain, you won't have to worry about the grain direction of the pin face. With a sharp chisel and a light touch, you can slice the wood fibers cleanly and easily.

UP THE SLOPE. I do as much of the work as possible working up the slope of the pin (photo at left). This seems to give me a little better control. But you want to avoid cutting clear across the sharp corner of the pin. It's likely to chip off instead of cut cleanly. So I'll stop short of the edge and then come at it from the other direction (left drawing above).



Reverse Directions. *After doing most of the trimming up the slope, reverse directions to complete the job.*



A Slight Undercut. *Undercutting the faces between the pins ensures the joint will close up tightly.*

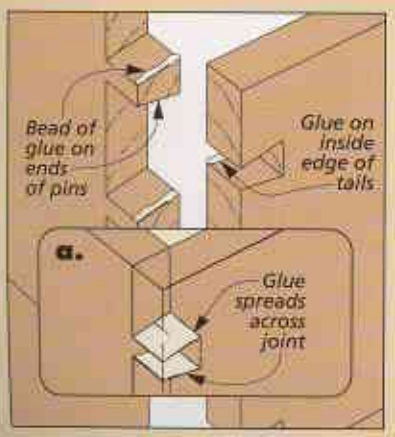
WATCH THE EDGES. When trimming the pins, I always try to be very careful near the edges. The bevels on the pins and tails can chip way too easily. If possible, I stay clear of the edges and limit my cuts to the inner face (left drawing). But if you have to trim clear to an edge to get a good fit, always work from the "outside in." This way, the wood is backed up and won't chip out.

TRIM AND TEST. A perfect fit doesn't come all at once. Pare a little bit and then test the fit. If the joint is still too tight, go through the marking process again and trim a bit more. But patience at this point pays big dividends when it comes to the final assembly. It often takes me several rounds of trimming and testing before I get it right.

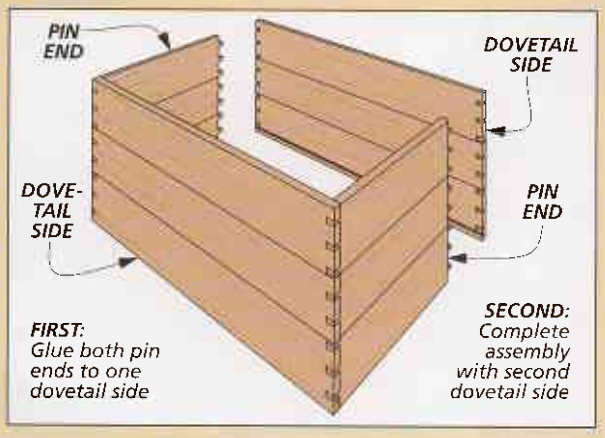
UNDERCUT. For me, the final step just adds a little insurance. I take my chisel and undercut the space between the pins slightly, as shown in the right drawing above. This ensures that the pins and tails will pull up tightly when clamped. You can avoid gaps by leaving a narrow "flat" along the outside edges.

Now, one corner is a perfect fit and you're ready to move on to the next. When all four corners are ready to go, the glue-up tips in the box below will help you finish the job. W

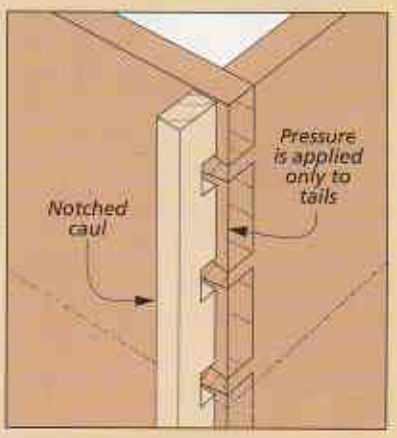
How To: A Perfect Assembly



Just a Little Glue. *A bead of glue on the ends of the pins and the mating edges of tails will spread across the joint when the pieces are assembled.*



One Half at a Time. *Rather than gluing up all four corners at once, you'll get better results by assembling one side at a time. But keep in mind that the dovetails have to fit over the pins, so a dovetailed side is added last.*



Notched Cauls. *When clamping dovetails, notched cauls will clear the pin ends and apply pressure where it's most needed — on the tails.*

looking inside
Final Details

▲ *Marquetry Box.* There are a lot of great details packed into this small project — splined corners, a sliding lid and of course, the elegant marquetry. Instructions begin on page 16.

▲ *More Than One Use.* The classic look of this dovetailed chest might make you think twice about hiding it away in the shop. As you can see, it works just as well as a handsome coffee table. You'll find the plans starting on page 32.

Curved-Stretcher Table. Making the graceful curved stretchers that join the tapered legs of this stylish table is a lot easier than you might think. You'll find out how it's done on page 22. ►